

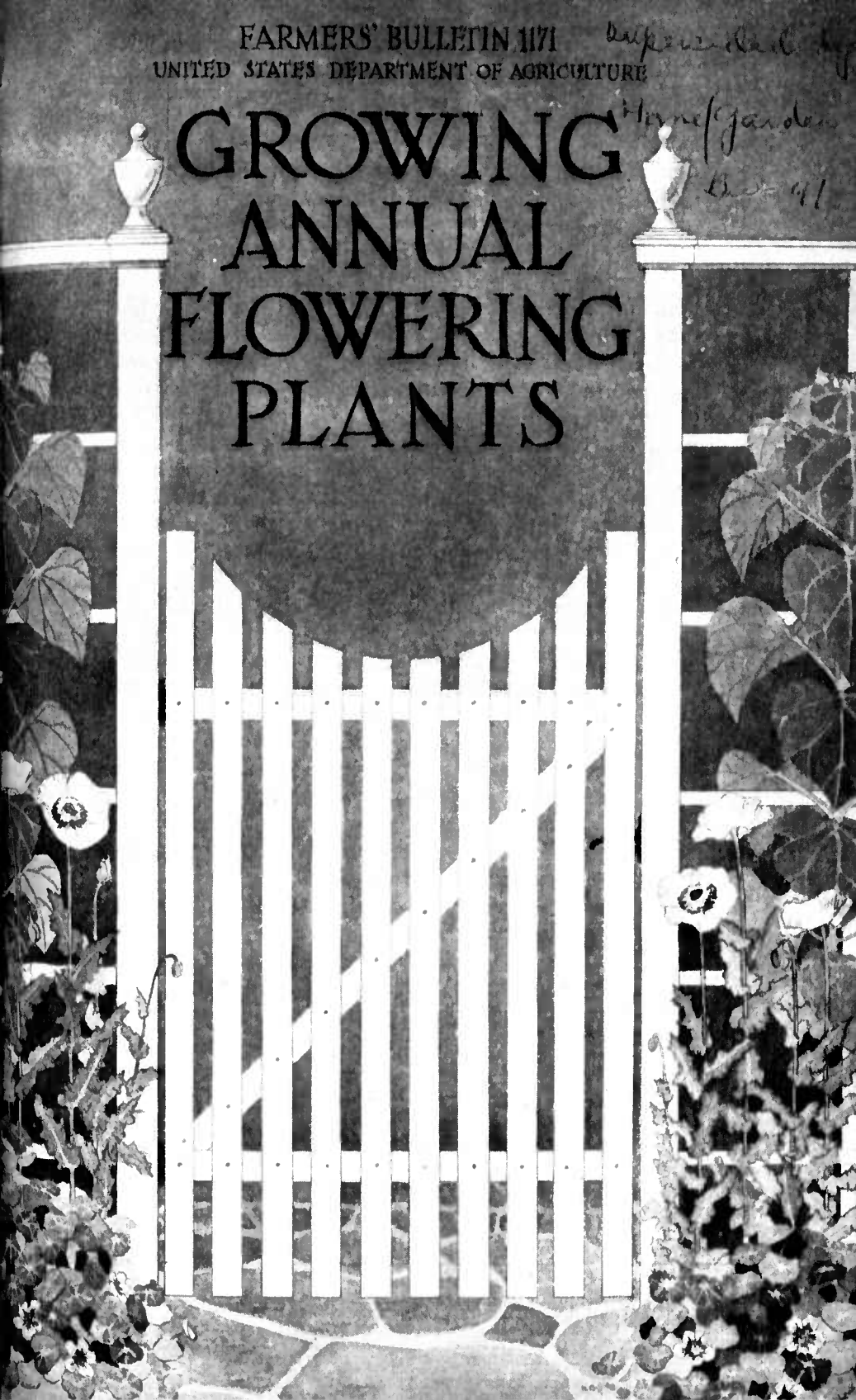
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FARMERS' BULLETIN 1171
UNITED STATES DEPARTMENT OF AGRICULTURE

Superior Gardening
Home Garden
Book 111

GROWING ANNUAL FLOWERING PLANTS



ANNUAL FLOWERING PLANTS are useful for quick though temporary effects and for flowers at a season of the year when blossoms on permanent plants are scarce.

Such plants in clumps in bays or pockets among shrubs or between herbaceous perennials make the beds and borders bright with bloom at a time when they might otherwise be dull and uninteresting.

Their quick growth makes them valuable in providing either foliage or flowers to fill temporary gaps in permanent plantings or to give a temporary effect where such planting does not exist. Several grow to a height of 6 feet or more, others hardly more than as many inches, while many are of intermediate height and show great variations in their habits of growth and in the color and character of their foliage.

Most of these annual plants are also valuable for supplying cut flowers for indoor decoration. They are of easy culture, profuse in bloom, have bright colors, and lend themselves readily to decorative arrangement.

Some of them can be sown in the open ground in the fall or in the early spring before freezing weather is past; others must be kept away from frost at all times. Some need to be sown where they are to bloom; others thrive better when transplanted one or more times. There are also differences in the kinds and conditions of soil moisture and light in which they will thrive best.

Coldframes and hotbeds are helpful in starting many of these plants, and for some of them they are essential to success, at least in the colder climates, if living-room windows or greenhouses are not available.

Contribution from the Bureau of Plant Industry

WM. A. TAYLOR, Chief

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GROWING ANNUAL FLOWERING PLANTS.

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USES OF FLOWERING PLANTS.

WHEN THE NEED for food, clothing, and shelter is reasonably satisfied, every human being, whether civilized or savage, begins to surround himself or herself with those things that please the eye. In addition to this, many people delight in the experience of making things grow. As a result of these impulses American home makers as a rule try to beautify the yards under their care, often achieving marvelous results under trying circumstances.

The most permanent and satisfying results are usually those obtained by a lawn as a foundation, with trees making a frame for the house and giving grateful shade, accompanied by shrubs and permanent flowers to round off the corners and give an air of naturalness and homelikeness.

In such a development there may be lacking during part of the season the brightness contributed by conspicuous flowers. Often this may be supplied by using annual flowering plants among the more permanent material, as most of them are gay with flowers at a season when most shrubs and perennials are not in bloom.

When permanent plantings, especially shrubbery beds, are newly set, they often look thin and ragged. Here, again, interplantings of annuals (fig. 1) may be helpful, either by filling the otherwise bare spaces with attractive foliage or with bright flowers or both.

Again, annual plants are useful on rented places where the tenant would seldom go to the expense of more permanent planting. They are quickly, easily, and cheaply grown, and their range of size and other characters makes it possible to secure temporarily many of the effects produced by the use of shrubs (fig. 2). These results may be obtained more quickly than with shrubs, but they are transient, as the first frost or at least the first freeze obliterates all their effect, and the winter appearance is as bare and bleak as though nothing had been done. Such temporary planting should not be relied upon when conditions will at all warrant the use of more permanent ma-

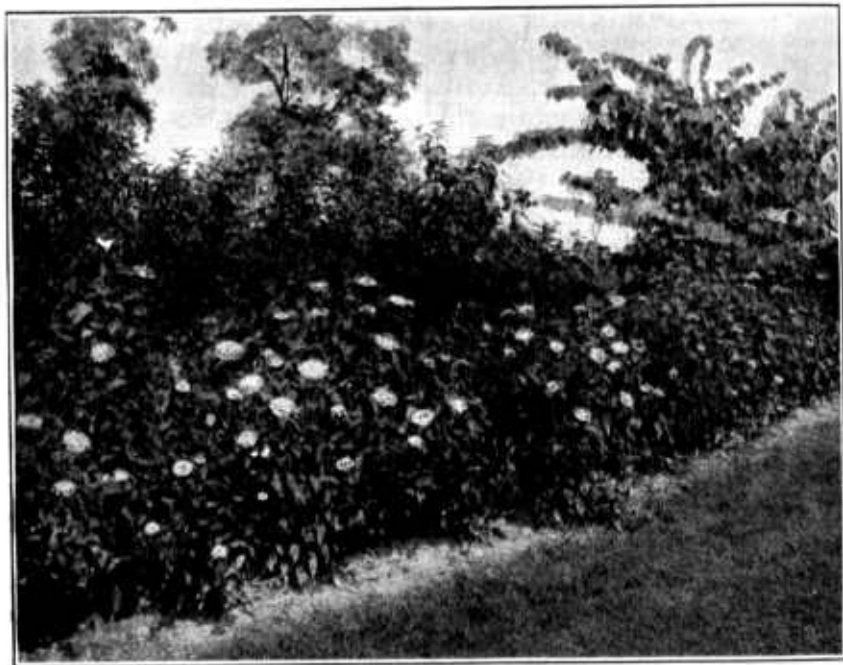


FIG. 1.—Annual plants used among shrubs for a temporary effect.

terial, but its use should certainly be encouraged where planting for winter as well as summer effect is not possible.

The tall-growing full-foliage plants, like tall castor-beans, sunflowers, and the sorghums, when massed against buildings, fences, or in front of other obtrusive objects or objectionable views, serve as attractive and efficient temporary screens (fig. 3). Moderate-growing broad-leaved plants, such as the dwarf castor-bean, can be used with advantage as screens for driveways or walks by placing a mass of the plants in the bay of the walk or drive. Lower growing plants when massed against a background of taller growing annuals or shrubs, either against buildings or on boundaries, are more effective than when used in beds in the open lawn. The formal bed, either in

the shape of an oval, circle, or star, in the center of a lawn is generally more obtrusive than pleasing.

When annual plants are desired for use as cut flowers the best arrangement is to plant them in an area set apart as a flower garden or to devote a portion of the vegetable garden to the purpose (fig. 4). When grown for cut blooms only, the most satisfactory and economical plan is to plant them in long rows, with ample space between the rows and the individuals in the rows. Unless the plants are given



FIG. 2.—Annual flowers used instead of more permanent material as the setting for a house.

sufficient room for full development, the flowers which they produce will be inferior in size and form. To secure the best results from plants to be used in this way, rich soil, ample space, and good culture are essential. They may be grown with horse cultivation, as vegetables are grown.

If the flower garden is a distinct feature of the place and its mission is to furnish an attractive retreat or a retreat and cut flowers, its general plan may be more pretentious; the straight rows may give place to irregular groups or masses, or even to formal beds and de-

signs, so long as these are not made the leading feature in the general adornment of the grounds. In fact, such a garden should be more or less inclosed from the rest of the grounds by border plantings. These need not be over 3 feet high, or they may be of the tallest growing kinds. The design within the garden may be either formal or informal, with beds and walks of formal geometrical designs of either straight or curved lines, or both; or they may be irregular in the extreme with no set design. If the walks and beds are laid out in a formal fashion the plantings may be made in geometrical designs, as carpet bedding if desired, or it may be strictly irregular or informal (fig. 5). In the informal garden only irregular or informal planting

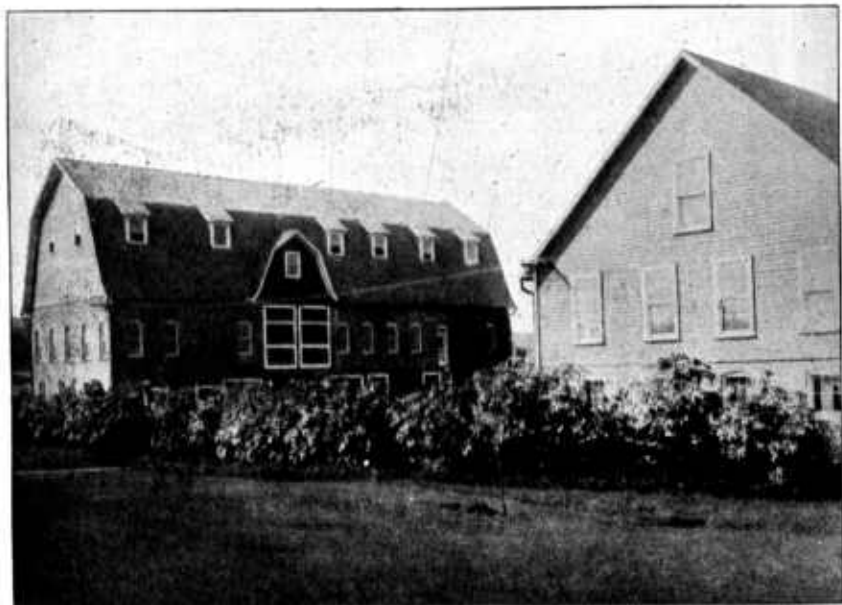


FIG. 3.—Annuals used for a temporary effect where permanent plants have not been established.

is appropriate. A piece of ground irregular in outline or rough and uneven in surface lends itself more readily to the informal garden than to the formal. The paths in such a garden can be irregularly curving and can be made to present endless opportunities for exhibiting plant characteristics. On level ground with a regular outline the formal garden is appropriate and often the simplest to develop. By adopting the informal method of planting, however, the formal garden can be made to present anything but a stiff and formal effect. If the garden is to be permanent, the walks should be of a permanent and satisfactory material. Turf is probably the most generally satisfactory walk surface as well as the most economical. Brick, stepping stones, and gravel are also desirable under some conditions.

If a fixed design is adopted, the soil in various areas of the garden may be modified by the addition of sand, muck, or clay and by the use of plant foods to adapt particular areas to the needs of special plants. Those which enjoy a dry, sandy soil can be provided for, while those which thrive best in a heavy soil can also be accommodated. If, on the other hand, a less formal and fixed character in the garden seems desirable, the whole area may be annually spaded or plowed up, the walks given a new course, and the general scheme of planting changed. Such an arrangement will give variety and novelty to the garden and for most purposes will prove quite as successful as the more permanent arrangement. During wet periods, unless the soil is of a sandy character, the lack of an improved walk surface will prove a disadvantage.

Often annual plants can be used appropriately on the grounds about public buildings and in parks. Fre-

quently the design of such grounds demands formal plantings (fig. 6), and many of the annual plants lend themselves admirably to such use.



FIG. 4.—Annual flowers bordering a path in a vegetable garden.

GENERAL CULTURAL SUGGESTIONS.

PREPARATION OF THE SOIL.

Soil for the growing of annual plants needs to be well supplied with available plant food and should be reasonably retentive of moisture, though well drained. In short, because the plants make a quick growth they must be provided with good growing conditions in order to enable them to make that growth. Among these plants, however,

there is a great difference in the requirements, some preferring a light soil, others a heavy one; some needing very rich soil, others giving more and better flowers on a comparatively poor one; some wanting considerable moisture either in the soil or atmosphere or both, others succeeding under much drier conditions; some liking full sunshine and hot weather, others preferring shade or cool weather or both.

The best soil for most of these plants is a light rich loam well supplied with rotted manure. A subsoil taken from the bottom of a cellar in excavating for a house is not suitable material upon which to depend as a satisfactory foundation for a flower bed. Where the soil is not naturally of the desired character, often much may be done to modify small areas to make them ideal for the culture of annuals.



FIG. 5.—A garden with a formal design but informal plantings.

If the soil is thin and poor, a bed 2 feet deep can be excavated and filled with soil specially prepared for the plants it is intended to grow. More clay can be used in the soil for plants requiring heavy soil and more sand and leaf mold in the soil for plants requiring lighter soils.

An ideal soil for general purposes can be made from sods of bluegrass from a rather heavy clay loam rotted for a year, then mixed with equal quantities of rotted manure, leaf mold, and sand. The manure and sod can be rotted together for a year, if just as convenient. A specially prepared soil of this kind will probably not be benefited much by another coat of manure the second year, but after that it should have annual dressings. Where good garden soil or other rich soil of suitable texture is available, probably the more common practice is to make the bed of suitable depth and fill it with

this soil well enriched with rotted manure. For permanent beds a careful preparation with good soil of proper texture is well worth the effort. If for any reason such thorough preparation is not considered advisable, as on a place that may not be used for more than a year or two or on rented property where the tenure is regarded as comparatively temporary, the attempt to have annual flowers should not be abandoned, as even with much less preparation results may be obtained that are well worth the effort if the kinds of flowers grown are selected with consideration of the conditions that prevail. Rotted manure, hen manure, prepared sheep or cow manure (obtainable from dealers in agricultural supplies), cottonseed meal, bone meal, or some similar organic manure, however, is almost essen-



FIG. 6.—A formal planting on the grounds about a public building.

tial to success. The value of these fertilizers is about in the order named. There should be as much rotted cow manure, or even rotted horse manure, worked into the soil as can be done reasonably. Less hen manure should be used, as it is several times richer than cow or horse manure. The prepared cow and sheep manure can be used at the rate of 1 pound for 3 square feet, and the cottonseed meal and bone meal at the rate of 1 pound for 5 square feet. All these materials should be thoroughly worked into the soil. They will not bring satisfactory results, however, unless the ground is reasonably good to start with, especially as to texture.

When larger areas are used for flowers, as in a special garden that can be handled with a plow, like a large vegetable garden or part of the vegetable garden, soil-improvement crops, like crimson clover

and vetch in winter or cowpeas in summer, may be used to enrich the soil and thus prepare it for another season's crops. It is possible sometimes to adapt some of these soil-improvement crops to the smaller areas of flower beds, although it is seldom advisable, as the limited quantity of fertilizing materials usually needed can ordinarily be provided for the comparatively small areas devoted to these plants about the home.

WATER.

Next in importance to providing a good soil supplied with organic fertilizing material is a proper water supply. The provision of a deep soil of proper texture well enriched with organic manure makes a water-holding reservoir that acts something like a sponge in its ability to supply water for the plants. Such a soil will absorb a large amount of water whenever given an opportunity and will give it up readily to the plants as it is needed. On the other hand, provi-

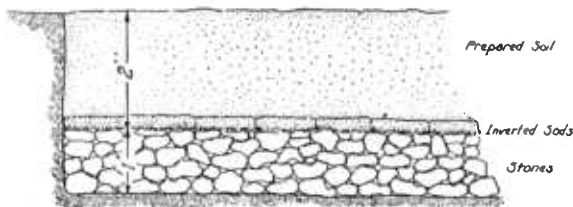


FIG. 7.—A bed specially prepared for plant growth where the normal drainage is inadequate.

sion must be made so that when such a soil has absorbed all that it is capable of properly holding, the surplus will drain away. If the surplus water does not naturally pass away freely, then artificial

drainage must be provided. In poorly drained soils, beds specially prepared, as already described, should be excavated 3 feet deep instead of 2 feet, and in the bottom a layer of stone should be placed, covered by inverted sods, which in turn should be covered by 2 feet of soil (fig. 7). This layer of drainage should be given some suitable outlet to carry off any water that might otherwise collect in it. This would preferably be by a drainpipe taken to a sewer or to some suitable outlet. A stone drain may be used, but it is likely to become clogged.

In addition to drainage, another essential is sufficient water during the growing season. Throughout much of the United States the natural rainfall on a bed well prepared, as already described, would be sufficient for success in most seasons. Beds close to a house, so that much of the rain is kept off by the building, need the natural rainfall, supplemented by occasional waterings. Irrigation is also necessary in dry climates and in moist climates in unusually dry seasons; also on sandy or other unusually dry soils. The amount and frequency of watering will depend both upon the dryness of the atmosphere and of the soil. A well-prepared retentive soil 2 feet deep

would probably not require watering more often than once a week, except possibly in the driest parts of the country, where the evaporation is excessive. Gravelly or sandy soils, especially if not well provided with organic matter, may require a thorough watering every other day. The watering should be done as infrequently as the soil and the climatic conditions will permit. Only experience can teach the best method. Too frequent watering is as bad as too long an interval between waterings. If watered too often the surface soil is kept moist and the root growth is encouraged near the surface. A day's neglect or unusual drying conditions will dry the feeding ground of the roots and kill them. But if the roots are required to go deeper by permitting the surface to become dry for 2 or 3 inches between waterings there will be less danger of unfortunate results from unusual conditions or a slight deviation from the regular schedule of watering.

STARTING THE PLANTS.

The plants considered in this bulletin are those that can be started readily from seed in the spring and will give bloom or satisfactory foliage effects the same season. Nearly all of these can be started in the open ground over at least a large part of the United States and will give the desired results before they are cut off by frost. In order to get a longer season of effect from the plants, many of them are usually started under glass, or early plantings are started that way. In the more northern sections of the country some kinds must be started in this way in order to have a season long enough to mature; others so that they may become established before the coming of dry or hot weather, which would be injurious to the young plants, but would not affect established ones.

Seed sowing.—All of the plants mentioned in this bulletin can be propagated from seed. In some cases, however, the seeds require special care in order to insure a good stand of plants, and it is for that reason that the particular methods necessary for that purpose are described.

A few of these plants must be sown where they are to mature, as they will not stand being moved. Many may be sown where they are to grow, though most of them are helped by one or two transplantings. Because better plants are obtained by transplanting, most annuals are sown in seed beds and moved to their permanent places. Such seed beds should be in well-prepared mellow soil, preferably somewhat protected from drying winds. If the soil is not mellow, the seedlings, especially from the smaller seeds, will have trouble breaking through any crust that may form, especially if moisture conditions are not exactly right. Protection from winds also helps to maintain uniform moisture conditions. The timely

use of a watering can is often a great help in promoting germination, but care should be taken not to use it too much. Seed beds require frequent light waterings rather than the infrequent drenchings best suited to more mature plants.

Seeds may be sown either broadcast or in rows. The inexperienced gardener should plant seeds in rows, especially for slow-germinating seeds, as quick-starting weeds may be more readily recognized and removed with less danger of disturbing the germinating seeds. Those starting near the seed row may be removed at once with great care or may be left until the seedlings are well sprouted. The dates of sowing the different kinds of seeds will be mentioned under the respective headings in connection with the discussion of other special cultural requirements.

Germination.—The germination of seeds depends upon a proper degree of heat, moisture, and oxygen from the air. All three of these conditions must be present to insure the best germination of the seed. Some seeds germinate best under a high temperature (80° to 90° F.), while others do best at a low temperature (40° to 60° F.). For most seeds, however, a soil temperature of 65° to 70° F. with an air temperature of 60° F. will prove very satisfactory for germination. Strange as it may seem, nature maintains conditions during the early part of the growing season approximating those above specified.¹ But naturally the high temperatures are much later in the season than the low ones. In order to obtain the higher temperatures early in the season a greenhouse, hotbed, coldframe, or a sunny kitchen window must be used.

Moisture.—Seeds in most cases grow best when the moisture in the soil is slight rather than excessive. A good test for moisture is to take a handful of soil and compact it gently in the palm of the hand by closing the fingers. If when released the soil remains solid and retains the impressions of the hand, it is too wet; but if when released it springs back and slowly crumbles or parts, it is in ideal condition for seed sowing. Such soil is well aerated, while the soil containing an excess of moisture has the air largely replaced by water.

The seed bed should be carefully guarded against extremes of moisture. It should not be allowed to get too wet and remain in that condition for any length of time; neither should it be allowed to get too dry. In the open these conditions are not likely to occur during a normal season. However, there are frequent exceptions. If too wet, little can be done to overcome the bad results, but if drought occurs irrigation will remedy the evil. Under artificial con-

¹ Reading of soil thermometers. (Tables.) In New York Agr. Exp. Sta., 2d-13th, 15th-17th Ann. Rpt., 1883-94, 1896-98, 1884-1899.

ditions, such as are obtained in a greenhouse, hotbed, or coldframe, the moisture content of the soil of the seed bed can be very carefully controlled. The confined atmosphere of such a structure prevents rapid or excessive evaporation, while any loss of moisture from the soil can be made good by watering. On a small scale the same results can be approached by placing a pane of glass over the receptacle in which the seeds are sown.

Soil temperature.—Slight variations in the temperature of the soil in which seeds are sown are usually a benefit rather than a hindrance to germination. With the grasses and clovers and probably with practically all other plants germination is more rapid and more complete in seeds subjected to alternations of temperature than in those kept under constant temperatures. Under normal conditions the warming of the soil during the day and the cooling at night furnish sufficiently wide variations. While these variations are less easily controlled than the variations in moisture, yet in structures such as hotbeds and coldframes the change from day to night temperature will be perceptible.

Seeds in order to germinate promptly must be placed under conditions which will enable them to take up moisture readily, and at the same time they must have a temperature which will be congenial to the young plant when it appears. The soil is the medium by which heat and moisture, under normal conditions, are transferred to the seed. In order to insure a quick exchange of moisture from the soil to the seed, the soil should be carefully firmed or compacted about the seed. By compacting the soil about the seed the capillary power of the soil is increased, and as the seed becomes an intimate part of the soil, the soil moisture is thus more quickly brought to the seed. In outdoor operations large seeds may have the soil compacted about them by tramping the row with the feet, while fine seeds may be treated by resting a board over the row and walking upon it from end to end. In hotbeds, greenhouses, and coldframes the compacting of the soil is usually accomplished by the use of a float, which consists of a piece of board about 6 inches wide and 9 or 10 inches long, with a handle attached, as shown in figure 8.



FIG. 8.—A float for firming the soil.

For all conditions save in the open, seeds may be sown in seed pans or in flats, as shown in figure 9. These boxes can be very conveniently and cheaply made from the pine boxes largely used for packing canned goods, soap, or other merchandise, usually 9 or 10 inches deep, which is sufficient to permit cutting them with a rip saw into three sections, each about 3 inches high. The top and bottom of the box will each make a complete flat, while the middle section

will be a frame which can be provided with a bottom by the destruction of a box for three sections; i. e., four boxes will furnish nine complete flats. Seeds may also be planted directly in the soil of the hotbed, coldframe, or in that upon the greenhouse bench as well as in the garden. Here, too, they may be sown broadcast, but it is preferable to sow in rows.

In covering seeds the rule under artificial conditions is to bury the seed to the depth of its greatest diameter. In outdoor culture, however, this is not the practice; seeds are usually covered about three to five times their diameter. With seeds the size of a grain of wheat it is safe generally to plant them 1 inch deep, and for those the size of beans 2 inches deep. Small seeds, the size of those of petunia or tobacco, should be scattered over the surface and the soil compacted with a float.

Transplanting.—The young seedling plants which are to be grown for their bloom should be transplanted as soon as the first true leaves are formed, so that they will stand at some distance from one another.

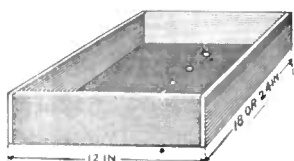


FIG. 9.—A flat.

For small, rather slow growing plants, such as pansies, 1 inch apart each way will afford ample room; with most plants 2 inches each way will be best; but with robust-growing plants, like the castor-bean, 4 inches will not be too much. With such vigorous growing plants, however, it is best to place the seeds directly in pots or

cans in order to prevent disturbing the roots of the young seedlings as well as to afford them ample space. If ordinary pots are not available, paper pots may be obtained cheaply or old strawberry boxes may be used. Transplanting has a tendency to make the plants stocky and provides opportunity for the development of an extensive root system.

The pleasure derived from floral decorations depends not only upon the perfection of the flowers but upon having a continuous display throughout the season. With most of the garden annuals early bloom can not be secured if seed sowing in the open must be relied upon exclusively. Fortunately, the gardener's art has devised cheap and efficient means, as it were, for anticipating nature. By the use of coldframes at the South and hotbeds at the North the season can be advanced several weeks. In the latitude of Washington, D. C., the time of sowing seed requiring the higher temperatures for germination can be advanced from May 1, the normal date of sowing in the open, to March 1, a gain of two months. Seed sown in a gentle hotbed at this date will give plants which, if properly handled, will forward the season of bloom two weeks.

HOTBEDS.

Hotbeds are usually constructed in one or the other of the following ways:

Temporary hotbeds.—A temporary hotbed may be made by using fermenting stable manure from grain-fed horses, preferably that with a small quantity of straw or litter in it. The manure should be placed in a broad, flat heap and thoroughly compacted by tramping. A heap 8 or 9 feet wide and any multiple of 3 feet in length, with the manure 14 to 16 inches deep, will give sufficient heat for the

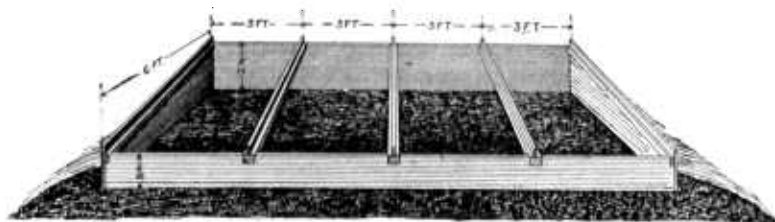


FIG. 10.—A frame to carry the sash of a hotbed or coldframe.

latitude of New York City and of Kansas City, Mo. Farther north, the heap should be made deeper and broader. Upon the surface of the manure heap a frame made like that shown in figure 10 will afford ample space for the development of the plants within. The backboard of this frame is usually 12 inches wide and the front 8 inches, and the two are connected by a tapered board 12 inches wide at one end, 8 inches wide at the other, and 6 feet in length. The back

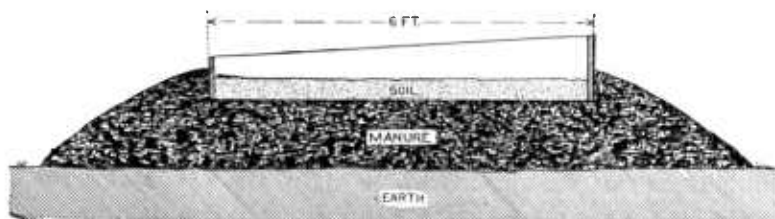


FIG. 11.—Cross section of a temporary hotbed.

and front of the frame are made in multiples of 3 feet in length, with an inch added for each division space between sash, which is provided for by the use of a T-shaped piece let into the frame to stiffen it and serve as a guide for the sash. The manner of making the guide as well as its appearance when in place is shown in figure 10. A cross section is illustrated by figure 11. If severe weather is likely to occur during the time the hotbed is in use, the frame should be banked with manure to give additional heat and protection. After placing the frame upon the manure heap, about 3 inches of good garden loam should be scattered uniformly over the area inclosed by the frame.

Place the sash in position immediately and allow the bed to heat up. Do not plant any seeds in the bed until the temperature begins to subside, which will be in about three days after the sash are put in place. When the temperature has fallen to 85° or 90° F. planting may be safely begun.

Permanent hotbeds.—A permanent hotbed may be so constructed as to be heated with fermenting manure or by radiating pipes from the dwelling or greenhouse heating plant. For a permanent bed, in which manure is to supply the heat, a pit 2 to 2½ feet in depth, according to the latitude in which the work is to be done, should be provided. The sides and ends may be supported by a lining of planks held in place by posts 4 feet apart; or, better still, a brick wall 9 inches thick, as shown in figure 12, may be used. In either case the

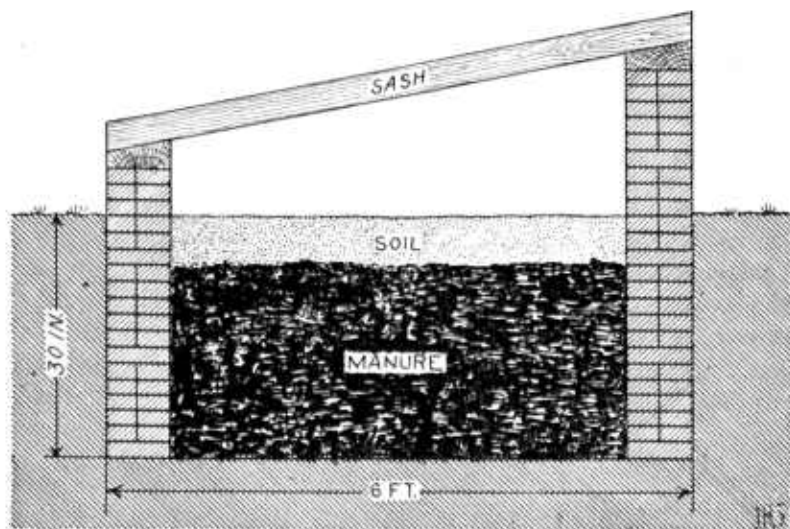


FIG. 12.—Cross section of a permanent hotbed or pit.

pit lining should come flush with or above the surface of the soil. The site for the pit should be on naturally well-drained land, and a tile drain from the bottom of the excavation should be provided to prevent water from accumulating in the pit and stopping the fermentation of the manure during the period the hotbed is in use.

Standard hotbed sash are 3 by 6 feet in size, and the interior cross-pieces for holding the sash are 1 inch wide. The pit, therefore, should be some multiple of 3 feet 1 inch in length less 1 inch, and the width should be the same as the length of the sash—6 feet. The plank frame or brickwork of the pit may be extended above the surface of the ground sufficiently to allow for placing the sash immediately upon these permanent structures, or a frame such as is described in connection with the construction of a temporary hotbed

(fig. 10) may be used. In the autumn the pit should be filled with leaves or straw and covered with loose boards or shutters to prevent it from becoming filled with snow and ice in the North, so that it may be ready for use early in March there, or in January or February farther south.

Sash.—Hotbed sash should be constructed of white pine, cypress, or redwood, and the sash bars should run in one direction only and that lengthwise of the sash. The bars may be braced through the middle by a transverse bar placed through the long bars below the plane occupied by the glass. The two ends of the sash should be made of sound timber, 3 inches wide at the top and 4 inches wide at the bottom end, mortised to receive the ends of the sash bars and with a tenon at the ends to pass through the side pieces, which should be $2\frac{1}{2}$ inches wide.

Glazing.—Placing the glass in the sash is one of the most important operations in the construction of a hotbed and is also one of the factors which largely determines the success or failure of the bed. The glass should be bedded in putty, i. e., the rabbet in the sash bar which is made to carry the glass should be filled with soft putty, and the glass, crowning side up, pressed firmly into the bed of putty and securely fastened with shoe nails or wire brads. Glazing points are not sufficiently secure. The first glass to be placed in any frame is a bottom light, i. e., the pane nearest to the front or lowest side of the hotbed when the sash is in place. The next light should be bedded in the same manner as the first and so placed as to lap about three-sixteenths of an inch over the top edge of the one first placed, like shingles on a roof. Brads should be driven below the lower corners of the second pane in order to prevent it from slipping down over the under one. The same method of procedure should be continued until the frame is filled with glass.

Size of glass.—While a frame with two courses of glass will admit a little more light than one with three, the breakage is somewhat less with small glass and the cost of repairing correspondingly less, and for these reasons the 3-course frame is more desirable. Nowadays many hotbed sash are made with a groove or slot into which the glass may be slipped and fastened at the bottom by brads to prevent them from slipping out. Grooved sash have the commendable feature of being cheaply and quickly glazed, but as the glass can not be lapped and as no putty is used the sash are not water tight and do not furnish as good protection from the wind as those in which the glass is bedded in putty.

Care of a hotbed.—At the North, in addition to the glazed sash, board shutters, straw mats, or mats of burlap or carpet will be needed as an additional protection during cold nights. During

bright days, even when the temperature outside is near the freezing point, it will be necessary to lift the sash a little at the high side of the frame to allow the hot air to escape and prevent injury to the young plants.

Watering.—Hotbeds should be watered in the morning only, and then only on bright days. Watering at night is dangerous, as the operation necessitates the lifting of the sash and the loss of the accumulated heated air, and the water itself lowers the temperature of the soil, so that in cold weather there is greatly increased danger to the plants from frost. Then, too, the excessive moisture resulting from dampening the leaves and confining them during the night provides congenial conditions for the development of mildew and damping-off fungi.

COLD FRAMES.

Coldframes are devices intended to protect plants from cold, without forcing them into growth. They differ from hotbeds in that no artificial means of heating are employed. The coldframe in its simplest form consists of a frame constructed like the one described in the chapter on hotbeds and illustrated in figure 10. When complete, the frame is placed upon a sheltered, well-drained piece of ground convenient to some main line of traffic between the house and some other important and frequently visited portion of the grounds. The frame, as above stated, is made to carry hotbed sash. The glass allows the sun during bright days to temper the air of the frames, so that by properly covering them at night with shutters, straw, or jute mats the heat can be retained and the plants within safely carried through severe weather. The frames may be banked with earth as an added precaution against cold.

Care of coldframes.—The chief precaution which must be observed in the management of a coldframe is that of proper ventilation. The object of this device is to retain plants in a healthy condition without adding to their growth. It is therefore very essential that the temperature of the frame at all times be kept at a degree which will not induce rapid growth. High temperatures and abundant humidity induce growth. The management of the frame should be so directed that during bright, sunny weather the sash may be lifted sufficiently to admit outside air in order to preserve a low temperature about the leaves of the plants. In some cases it will be found that during bright days even in midwinter the sash will have to be removed from the frame for a few hours at midday in order to preserve a sufficiently low temperature. On the other hand, care should be exercised in ventilation and watering so as not to reduce the temperature of the frame late in the afternoon, as such treatment is liable to lead to frost injury.

Plants for coldframes.—It stands to reason that only the hardiest plants can safely be carried over winter in a coldframe. Many of the plants which are grown as annuals will, with protection, become perennials, or can be made to give a much longer period of bloom if sown in the autumn and carried over winter in a coldframe. Among plants which will be greatly benefited by such treatment are pansies, dianthus, and chrysanthemums.

PITS.

The pit is a more elaborate and efficient coldframe which, as its name indicates, consists of an excavation. This excavation may be from 2 to 4 feet in depth, with sides protected by plank or brick walls, as shown in figure 12, upon which a frame similar to the one described for the coldframe is placed and covered with sash. The pit has an advantage over the coldframe for some purposes. It can be used, for instance, to store some of the hardier flowering plants which are to be placed in tubs or vases about the lawn during the summer. Plants in a pit are protected by the warmth of the soil. In latitudes where the soil does not freeze to a depth of more than 10 to 15 inches the pit will be found of greatest use. Seedling plants may be held over winter in trays or flats in pits as safely as in frames.

Management.—The same precautions in regard to ventilation, covering, and watering must be observed in the care of a pit as in the case of a coldframe.

THE CULTIVATION AND USES OF ANNUAL FLOWERING PLANTS.

As already outlined, annual flowering plants may be used both as backgrounds and foregrounds in planting home surroundings. Their adaptability for these various purposes depends largely upon their relative heights; therefore, for purposes of discussion the plants have been grouped somewhat arbitrarily according to their usual heights. In addition to the common name, the scientific name is given in a footnote in order positively to identify the plants, as common names often differ in different localities. Then, too, in many cases seedsmen list their seeds under the scientific names, while others use the common ones. There have been included, also, the general color range of the plants and their adaptability to conditions of sun or shade and relative hardiness. Their relative hardiness or susceptibility to frost is important as a guide to the method of starting seedlings. The very hardy can be sown before freezing weather is past; that is, while the ground still freezes at night but thaws during the day. They may often be sown late in the fall for germination in the early spring. The hardy are those that can be sown after

freezing weather is past and will stand frosts. These correspond to such vegetables as beets, radishes, and lettuce and should be planted as soon as the ground is dry enough to work.

Half-hardy plants are those that can be sown in the open ground a week or two before the last frost may be expected or that can be started under glass and transplanted to the open ground while there may still be danger of slight frosts, but which do better with temperatures above the frost point. Seeds of such plants may be sown about the time leaves begin to appear on the trees that put out their foliage earliest or about the time the earliest string or snap beans are sown.

Tender plants are those that are checked or stunted by an approach to frosty conditions and are injured by even the slightest frost.

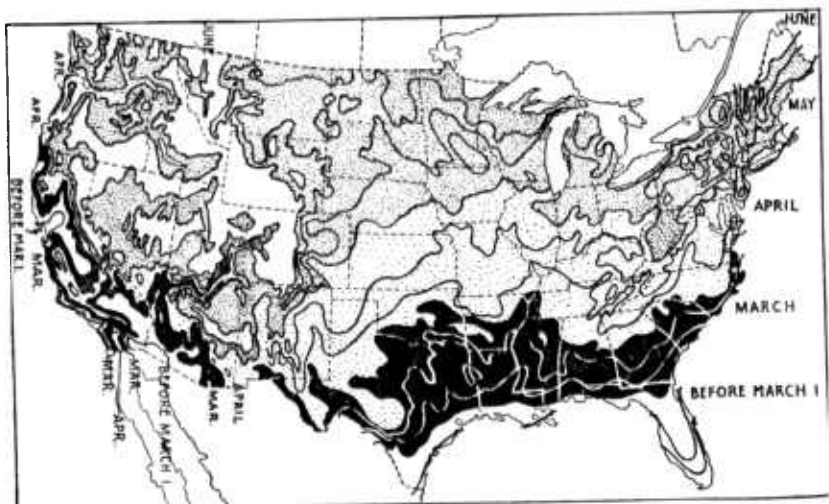


FIG. 13.—Outline map of the United States, showing the date of the average occurrence of the last spring frost.

Many of them must be started under glass, especially in the North, in order to have a sufficiently long season in which to develop. Most of them are natives of tropical or subtropical countries and require a long season for growth. Their seeds should not be put in the open ground until all danger from frost is past, which is about corn-planting time or when white-oak leaves are the size of squirrels' ears. Tender plants should not be taken from frames and put into their permanent places until 10 days later than this.

From the foregoing it will be seen that the time of planting the different flowers will depend on the forwardness of the season, especially as regards freezing and frost. The conditions with respect to these factors vary greatly, the map shown as figure 13 giving some idea of the approximate date of the last frost at different points in

the United States. In the map the shaded portions are those in which the last frost occurs in March or in May, the lines in them indicating intervals of 10 days. The lines in the unshaded portions similarly indicate 10-day intervals. From the eastern foot of the Rocky Mountains westward only the monthly intervals are attempted to be shown, as frost conditions there are governed almost entirely by eleva-

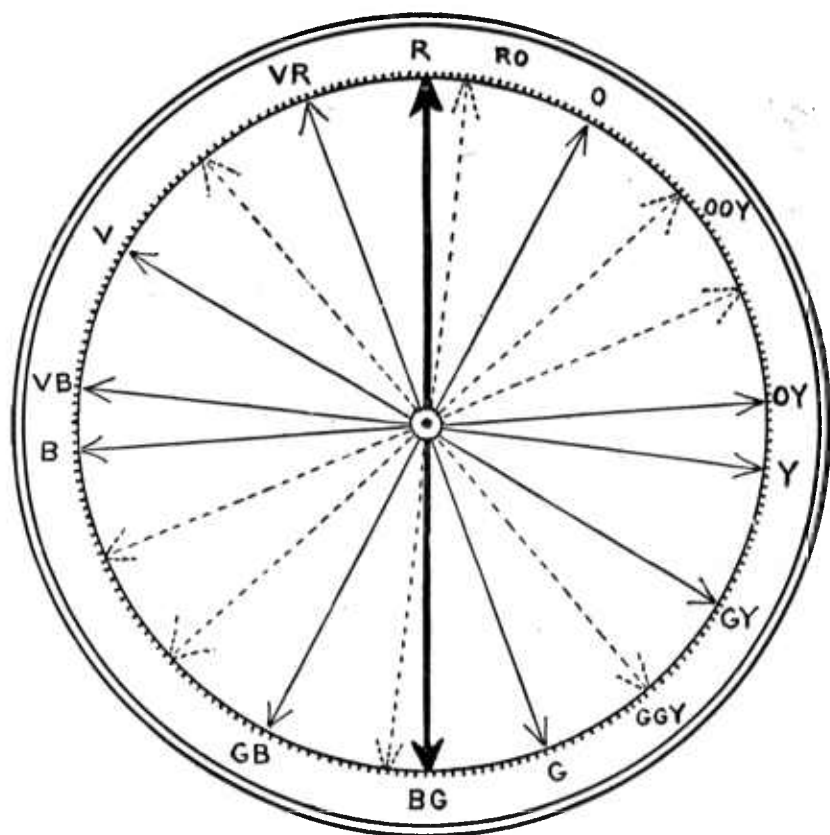


FIG. 14.—Diagram showing good and bad color combinations. Colors immediately adjacent to one another or opposite one another are appropriate for use together. Those between should be separated by masses of foliage or by white flowers. B=blue, G=green, O=orange, R=red, V=violet, Y=yellow.

tion rather than by latitude, which makes it almost impossible to give any satisfactory idea within the limits of this map.

Most of the annual flowering plants are so vivid in their colors and when planted are used in such large masses that more care is probably required to avoid bad color combinations than with other classes of plants. When used in clumps in shrubby beds so that there is other foliage to separate the colors, there is much less danger of getting bad combinations than when large masses of different kinds of annuals are used in a garden or in a single border. The

colors found in the different varieties of a single species usually will not clash. As a guide in selecting flowers that may be safely used near one another, the color diagram shown as figure 14 is presented. The colors opposite one another on the diagram are safe to use together, as well as those close beside one another, but those at right angles to one another—that is, the intermediate ones—are not safe to be used except by those who have made an extended, careful study of color combinations.²

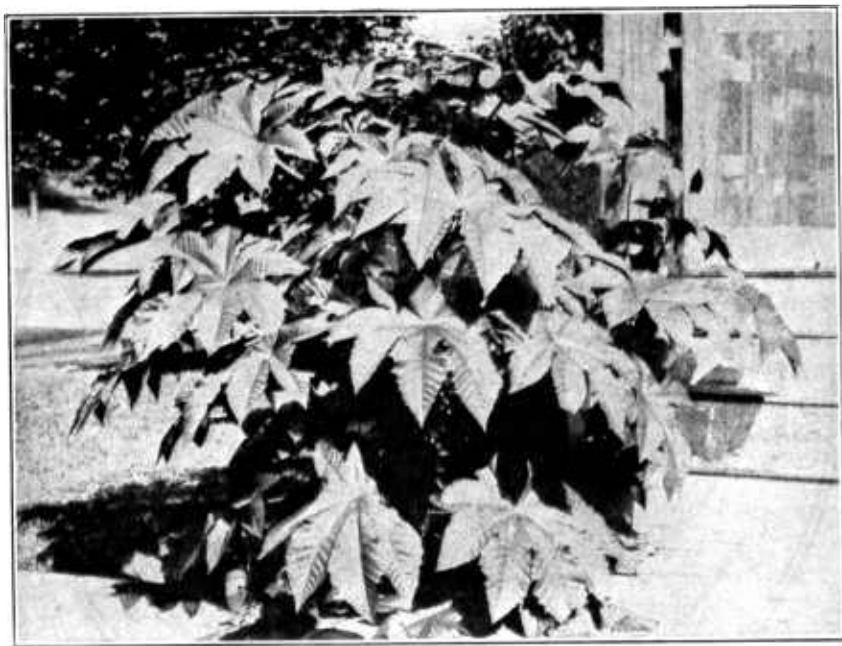


FIG. 15.—Castor-bean.

BACKGROUNDS AND SCREENS.

Among annual flowering plants there are a few that are excellent for backgrounds and screens. Among these are castor-beans, cosmos, sunflowers, sorghums, feterita, milo, broom corn, and even Indian corn.

Castor-bean.—The castor-bean, or castor-oil, plant³ is especially valuable because it is one of the few annuals which can be used to produce a semitropical effect (fig. 15). Its rapid growth, large size, and easy culture make it valuable as the central object in groups where rich, luxuriant growth is required. The variety of color in the foliage of the different sorts, ranging from green to deep bronze, is of value in giving contrast, and when used in combination with

² A suggestion as to the reasons for this is given in Farmers' Bulletin 1087, entitled "Beautifying the Farmstead."

³ *Ricinus communis* L.

cannas, caladiums, coleus, or scarlet sage most striking effects can be produced. As a background for lower growing plants, the castor-bean has no equal among garden annuals. Only the annual climbing vines when provided with suitable supports equal it as a low screen. It can be used with good effect in groups, as masses along shrubbery borders, as belts for covering and shutting out undesirable views, and singly against buildings or to fill gaps in newly planted shrubbery. This plant loves a rich soil, plenty of moisture, full sunlight, and great heat. In the North it is most satisfactory when started in a gentle heat four or five weeks before the last frost. A hotbed, greenhouse, or living room can be used for the purpose. As soon as the first true leaves have formed, the young plants should be pricked out into small boxes or pots, or they may be started in strawberry boxes or in paper pots, with one seed to a pot. They should be kept growing slowly until all danger of frost has passed, when they may be transferred to the open. After transplanting the young plants it is desirable that they have sufficient room to prevent them from growing too tall and consequently from losing their lower leaves. They should be from 3 to 6 feet apart, depending on the variety.

If planted in the open ground about the date of the last frost, or 10 days before it would be safe to set plants in the open, they will make a growth of 4 to 6 feet in 10 weeks. The varieties range in height from 3 to 15 feet and have leaves of corresponding size.

Cosmos.—*Cosmos*⁴ is now one of the notable fall flowers. It is a vigorous tall-growing annual, yet its bright, bold flowers have a daintiness and airiness which is heightened in effect by the feathery green foliage (fig. 16). It is most effective when planted in broad masses or along background borders against evergreens or fences at some distance from the house and the garden walks. The white, pink, and rose-colored daisylike flowers are borne in great profusion and come at a season when they are very acceptable. In the North, seed started in the house at the same time as castor-beans will give plants 3 or 4 feet in height by September. Because of the robust habit of the plant, the young seedlings should be thinned to 18 inches apart when grown on moderately good soil. Sowing the seed late and in poor soil will dwarf the plants. In the climate of Washington, D. C., of St. Louis, Mo., and farther south they perpetuate themselves by self-sown seed. These volunteer plants can be utilized for early bloom. *Cosmos* is especially desirable for the warmer parts of the country, where it grows and blooms luxuriantly with little care.

⁴ *Cosmos bipinnatus* Cav.

In the North only the earliest varieties are likely to mature soon enough to bloom. As the plants approach maturity it is well to give them some support, as they are liable to be bent over by the wind.



FIG. 16.—Cosmos.

Sunflower.—Sunflowers⁵ are tall-growing bright-flowered annual plants that have not received the attention they deserve. They have



FIG. 17.

suffered the misfortune of being cheapened by use as a burlesque. In reality, however, the tall-growing large-flowered sorts as well as the dwarf many-flowered varieties (fig. 17) are useful when skillfully employed in mixed plantations with other herbaceous annuals. The golden yellow disks are like

⁵ *Helianthus annuus* L. and other species.

sunbursts among the shrubbery. The tall habit and dense foliage of some varieties make them suitable for backgrounds and screens. Because of their long stems and extraordinary lasting qualities they are of value as cut flowers.

Sunflowers are of easy culture. The seed should be planted in the open garden in spring at about the time that corn or beans are

planted, or about a week after the average last frost, and the plants should be thinned to stand from 2 to 4 feet apart, depending upon whether it is a dwarf or a tall-growing variety. The height ranges from 1 to 10 feet with the different varieties, while the habit of growth, character of foliage, and number of flowers vary correspondingly.

Sorghum,⁶ *feterita*,⁶ *milo*,⁶ *broom corn*,⁶ *Indian corn*.⁷ — These plants may all be considered together, as their treatment and use in landscape planting is similar. Used with



FIG. 18.—Sorghum.

castor-beans and sunflowers they may be very effective, as their foliage and habit of growth contrast strongly with the foliage of the plants already described. They may also be used effectively in clumps and groups of their own (fig. 18) or in borders. They need other plantings at their base; otherwise the stems will be bare and unsightly. They can be used effectively among thick-foliaged shrubs that have not yet grown sufficiently to take all the ground. They should be planted among plants with whose foliage they form a contrast and above which their plumelike blooms, and in some cases fruit, can show effectively.

⁶ Cultivated forms of *Holcus sorghum* L.

⁷ *Zea mays* L.

Varieties vary in height from 3 to 10 feet. They are sun and warmth loving plants and should all be planted about the time Indian corn is planted, or when danger from frost is past. They are easily grown where the weather is warm.

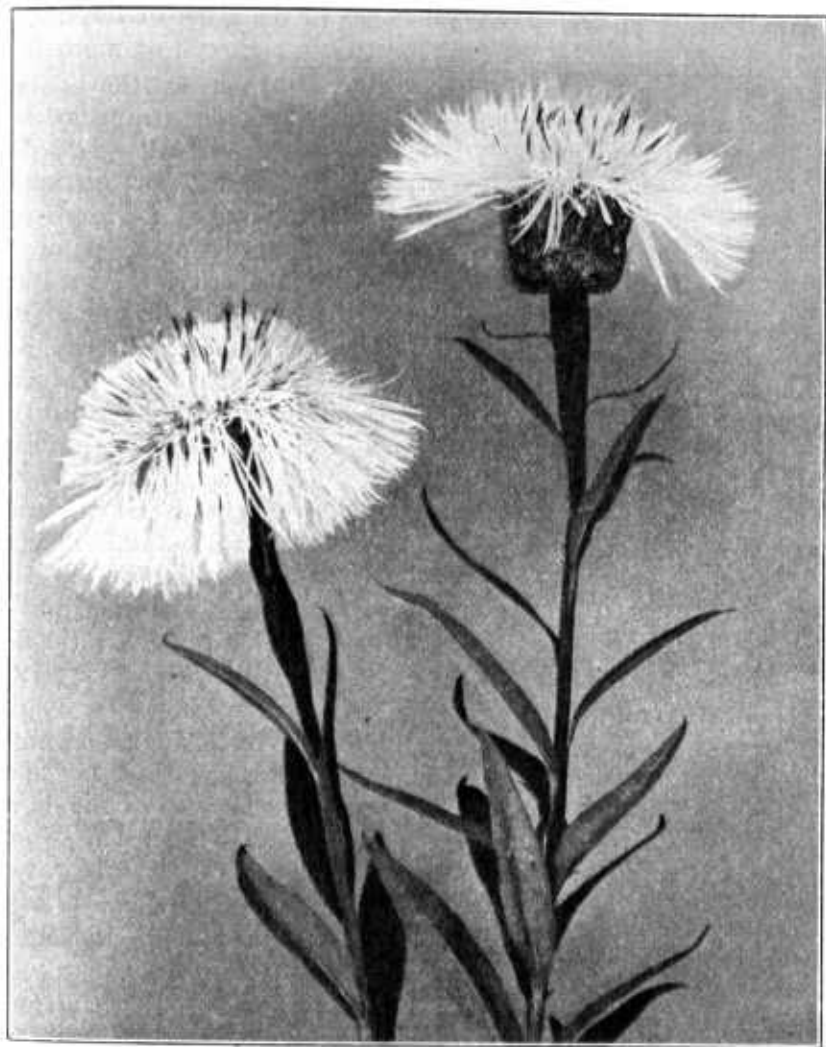


FIG. 19.—Basketflower.

In addition to the annual plants mentioned, cannas and elephant ears are vigorous-growing plants, valuable for their foliage, that are grown from roots and tubers, respectively. The first cost of these is much more than for seeds, but where a greater variety is desired they are valuable. By digging the roots before freezing weather

and storing them in a cellar where the temperature is maintained well above freezing, they can be kept from year to year.

PLANTS GROWING 3 OR MORE FEET HIGH.

There are a large number of annual plants of intermediate height, many of which are very striking. Some of the taller of these that



FIG. 20.—Feather cockscomb.

grow 3 or more feet high are the basketflower, feather cockscomb, dahlia, Joseph's-coat, larkspur, love-lies-bleeding, heliopsis, prince's-feather, sweet-sultan, spiderflower, and summer cypress.

Of the plants already described the castor-bean, sunflower, and feterita have dwarf varieties of about this height.

Basketflower.—The basketflower⁸ is a hardy native thistle-like flower (fig. 19), growing to a height of 3 feet, bearing large rosy lavender flowers. It should be sown in the open ground in early spring about as soon as the ground is in condition to work. It does well when sown where it is to bloom, but can be success-

fully transplanted. It prefers cool weather and is not as easy to grow as many other annuals.

Feather cockscomb.—The feather cockscomb,⁹ sometimes called plumed cockscomb, but more commonly known as celosia or celosia

⁸ *Centaurea americana* Nutt.

⁹ *Celosia argentea* L.

plumosa, is a plumelike and graceful tender annual (fig. 20), growing 3 feet tall, with showy flowers, either crimson or yellow. The plumes may be cut before they are fully ripe and may be dried in the house for winter bouquets. Seeds may be sown out of doors after danger from frost is past or they may be sown earlier under glass. They prefer a light soil, not too rich, but grow easily almost anywhere.

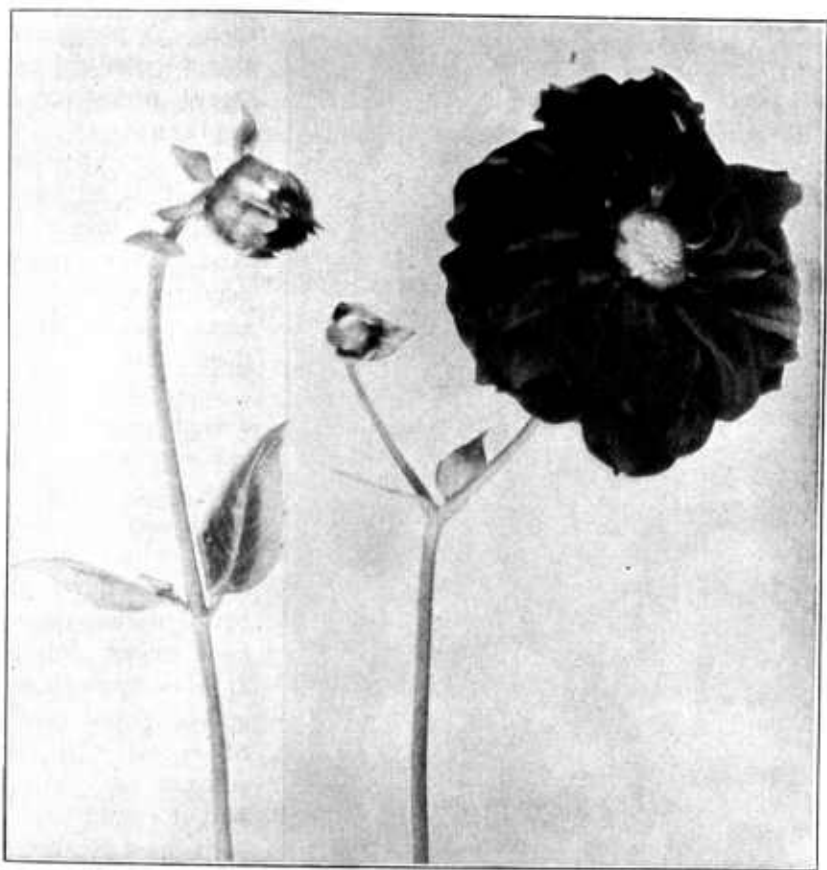


FIG. 21.—A dahlia grown from seed as an annual.

Dahlia.—The dahlia¹⁰ has many double and some single forms in reds and yellows. They are usually grown from rootstocks, but they can be grown from seed readily by those who have had a little experience with plants. The double-flowered varieties must be sown as early as April for satisfactory bloom the first year, while the single varieties may be sown as late as July 1. Dahlias (fig. 21) must be grown

¹⁰ *Dahlia rosea* Cav.

where frost can not reach them, so in the North it is necessary to start the double-flowered ones under glass.

As soon as the tops are hurt by frost the roots should be dug on a warm sunny day so they will not be chilled, and then they should

be stored in a warm cellar with as much dirt as possible about them. A place suitable for cannas and sweet potatoes is satisfactory for dahlias. Another method is to store them in boxes of sand. New plants may be started the next season from these roots.

Joseph's-coat.—*Joseph's-coat*¹¹ is an easily grown upright plant reaching heights of 3 or more feet, whose attractiveness is due to the brilliant red, yellow, and green foliage. It likes warmth and sunshine and plenty of room, with the soil not too rich. It will not stand frost, so it must be started either late out of doors or under glass if results early in the season are desired.

It can be started six weeks before danger



FIG. 22.—Love-lies-bleeding.

of frost is past and may be transplanted once or twice before setting it in the open ground.

Love-lies-bleeding.—*Love-lies-bleeding*¹² (fig. 22) is another easily grown, rather upright annual with drooping blood-red foliage. It

¹¹ *Amaranthus gangeticus melancholicus* Voss.

¹² *Amaranthus caudatus* L.

should be handled in the same manner as Joseph's-coat and responds to the same cultural conditions.

Heliopsis.—*Heliopsis*,¹³ sometimes miscalled orange sunflower, is a hardy perennial with pale orange-colored flowers that will bloom the first year from seed. It is easily grown and will attain a height of 3 to 4 feet. Seeds may be sown early out of doors about the time the last frost may be expected.

Prince's-feather.—*Prince's-feather*¹⁴ is an upright annual, 3 to 4 feet tall, with dark red feathery flowers. Its culture is like that of Joseph's-coat, already discussed, and is adapted to the use of a beginner.

Sweet-sultan.—*Sweet-sultans*,¹⁵ or royal sweet-sultans, are handsome sweet-scented, thistlelike, hardy annuals growing to a height of over 3 feet, with red, purple, lavender, and white varieties. They are useful both for cutting and in borders. They are sown early in the spring for the best results, so that they will get an early start and bloom before hot weather. They will stand some frost.



FIG. 23.—Spiderflower.

Spiderflower.—The spiderflower¹⁶ (fig. 23) grows to a height of 3½ feet and forms large loose heads of rose-colored flowers borne well above the foliage for a long season. The seed should be sown in the open ground soon after the weather is settled, or two or three weeks before the last frost may be expected. The plant is of easy culture.

Summer cypress.—*Summer cypress*,¹⁷ also called standing cypress and Mexican flame plant, is a useful plant for a pale-green mass effect or for formal effects (fig. 24). *Belvedere*¹⁸ is a similar plant of more erect habit. The foliage is fine and light in color, but very effective when used in masses. When grown with plenty of room

¹³ *Heliopsis helianthoides pitcheriana* Fletcher.

¹⁴ *Amaranthus hypochondriacus sanguineus* Hort.

¹⁵ *Centaurea moschata* L.

¹⁶ *Cleome spinosa* Jacq.

¹⁷ *Kochia trichophylla* Stapf.

¹⁸ *Kochia scoparia* Schrad.

they form uniform oval symmetrical specimens 3 or more feet high. For specimen plants they should be set at least 4 feet apart; for a hedge, 18 inches or 2 feet apart. Summer cypresses do not thrive in shade, the part that is shaded failing to grow, thus making the plants one sided. On the other hand, their growth is stimulated by the close proximity of an electric arc light. As they approach maturity the whole plant gradually turns crimson, later becoming brown and unattractive on the approach of frost. The bloom is inconspicuous, but the plant seeds freely, and the second season the



FIG. 24.—Summer cypress on the back of a bed.

ground will be covered with seedlings, which, however, are readily killed by hoeing. Seed may be sown thinly in the open ground early in the spring. Culture is of the easiest.

**PLANTS GROWING ABOUT
30 INCHES HIGH.**

Plants that grow about 30 inches high are clarkia, cornflower, larkspur, scabiosa, annual poinsettia, scarlet sage,

strawflower, and zinnia. Some of the varieties of sunflowers are also as small as this.

Clarkia.—*Clarkia*¹⁹ is one of the prettiest of hardy native annuals. It comes to us from beyond the Rocky Mountains. Its freedom of blooming, with the variety and brightness of its white, salmon, or scarlet flowers, makes a bed of these plants an attractive sight. They are useful, too, for hanging baskets, for vases, as edging plants, for low massing, or for borders.

The seed should be sown outdoors in early spring and the plants should be grown in partial shade. The clarkias thrive in a warm light soil, and their period of bloom is from midsummer to late autumn. The average height of the plant is 2 to 2½ feet.

Cornflower.—The cornflower²⁰ (fig. 25) is also known as bachelor's-button, "bluebottle," "ragged-sailor," "kaiserblume," and sometimes erroneously as "ragged-robin" and "bluet." These bright-flowered plants are of a hardy nature, requiring simple cul-

¹⁹ *Clarkia pulchella* Pursh., *C. elegans* Douglas.

²⁰ *Centaurea cyanus* L.

ture, yet they are among the most attractive and graceful of all the old-fashioned flowers, bearing freely blue, white, or rose-colored blossoms. When placed in water after cutting, the flowers increase in size. The seeds of these annuals should be sown in the fall or in the spring from the time the ground is fit to work until the last of May in the North and the last of June in the South. They may be started earlier under glass. The young plants should be thinned to 4 to 6 inches apart. They thrive well on all moderately rich garden soils. When once established they will usually reseed themselves year after year.

Larkspur.—The larkspur²¹ is especially valuable because of its rich blues, as blue is a comparatively rare color among our cultivated plants. There are also white varieties and a red species. The taller growing annual varieties reach a height of 30 inches and are valuable for bedding and borders as well as for cut flowers. There are other varieties only about 18 inches high (fig. 26) that are even better for bedding purposes. There are both single and double forms of the annual larkspurs. In addition to these there are many perennial varieties that will bloom the first year from seed, so they can be used as annuals with reasonable satisfaction. These vary in height from 18 inches to 5 feet. Larkspurs are easily grown, but do best in a rather cool, moist soil. The seeds of the annuals may be



FIG. 25.—Cornflower.

²¹ *Delphinium ajacis* L., *D. consolida* L.

sown in the open ground either in late fall or in spring, preferably the former, so they will be ready to germinate early in the spring. In the South the perennial varieties may be handled in the same way. As the seedlings grow they should be thinned to stand from 6 to 18 inches apart, depending upon the variety. Among the annual lark-



FIG. 26.—Larkspur.

spurs there are in addition to the blue varieties white, buff, rose, pink, and similar shades. These may all be sown separately or in mixture with entirely satisfactory results.

From Norfolk northward the perennial varieties need to be started under glass in order to bloom the first year from seed, and the young

plants can be transplanted into flats before they are an inch high, being placed 3 to 4 inches apart, and by gradually hardening them off they can be set in the open ground before corn-planting time. These plants can be set 6 to 8 inches apart the first year, but need to be farther apart the following year.¹

Some species bloom both early and late, and the blooming period of all can be prolonged by removing the withered flower stems promptly.

Scabiosa.—*Scabiosa*,²² often called mourning bride, pin-cushion flower, and sweet scabious, is an easily grown old-fashioned half-hardy annual (fig. 27) that is very attractive and satisfactory both for cutting and for borders and beds. The flowers, which vary from white through rose, crimson, and blue to almost black, are borne on long stems and keep a long time either on the plant or when cut. The seed should be sown in the open ground after danger from hard frost is



FIG. 27.—*Scabiosa*.

past and the plants will bloom in about 12 weeks. There are also hardy perennial kinds.

Annual poinsettia.—The annual poinsettia²³ (fig. 28), Mexican fire plant, or painted-leaf, is a handsome green-leaved plant that about midsummer changes the color of several of the leaves at the ends of the branches to scarlet. As the plant is naturally much branched and bushy, it makes a great show. It attains a height of 2 to 3 feet. Seed should be sown in the open ground when freezing weather is past.

²² *Scabiosa atropurpurea* L.

²³ *Euphorbia heterophylla* L.

Scarlet sage.—The scarlet sage,²⁴ or scarlet salvia, is a standard bedding plant that keeps the garden bright with color until late in autumn. This plant lends itself to many uses (fig. 29); it makes a good pot plant, does well in window boxes, and is useful for cutting, to give color. Its commonest use, however, is as a hedge or border plant, giving long broad bands of vivid scarlet. On account of its very striking color, caution needs to be observed in using it in this way. It can be most effectively used in small clumps among or

against masses of green.

Seeds should be sown in window boxes or frames six weeks before the last frost and the plants set outdoors after all danger from frost is past. Or the seeds may be sown outdoors, if the place is protected from heavy rains and strong winds, about the date of the last frost, so the seed will not germinate until after all danger of frost is over. The plants grow and bloom profusely in any light rich soil. Besides



FIG. 28.—Annual poinsettia.

the scarlet sage, there are blue salvias, which are perennials, most of them being hardy. Both the tender and hardy perennial sorts bloom the first year, and all may be treated as annuals.

The strawflower.—The strawflower²⁵ is an attractive, easily grown, hardy annual, bearing double lemon and yellow flowers an inch and a half across (fig. 30). These plants are very effective for beds and borders, and the flowers may be cut and dried for winter bouquets. They succeed in any good garden soil, but respond to plenty of fertility. The seed may be sown in the open ground as soon as all danger of freezing is past. They do better, however, if transplanted once or twice. They should have plenty of room to develop, not

²⁴ *Salvia splendens* Ker.

²⁵ *Elichrysium bracteatum* Andr. (*Helichrysium*).



SCARLET SAGE

being planted closer than 12 inches apart. They grow to a height of 30 inches.

Zinnia.—The zinnia,²⁰ sometimes called youth-and-old-age, is easily grown from seed sown in the open ground. When sown as soon as the ground is fit to work, the plants will bloom abundantly and continuously through the entire season (fig. 31). Of late great improvements have



FIG. 29.

²⁰ *Zinnia elegans* Jacq.

been wrought both in the color and form of the flower. Their colors are white, yellow, orange, pink, rose, and scarlet. During the month of August zinnias are at their best. To secure large flowers and a profusion of bloom the plants must be given ample room for full development as well as an abundant supply of food. Strong rich soils suit them. If the seeds are sown in a dwelling house or in a hotbed and the young plants are pricked out once or twice before being placed in their permanent situations more satis-



FIG. 30.—Strawflower.

factory results will be secured than from outdoor-sown seeds, unless equal care in thinning or transplanting is given. The plants can be used for groups, beds, borders, garden lines, and summer hedges. Their average height is $2\frac{1}{2}$ feet, ranging from 2 to 3 feet.

**PLANTS GROWING ABOUT
24 INCHES HIGH.**

Several of the annual flowering plants that grow about 2 feet high are very useful both for ornamental planting and cut flowers. Among these are baby's-breath, calliopsis, China aster, summer chrysanthemum, cockscomb, rudbeckia, gaillardia, lupine,

African marigold, Japanese bellflower, salpiglossis, and snapdragon. The garden balsam, Shirley poppy, and snow-on-the-mountain are other plants of this height desirable for ornamental plantings but not suitable for cutting. Of the plants already discussed the larkspur, scarlet sage, and sunflower have varieties that are about this height.

Baby's-breath.—Baby's-breath²⁷ is a dainty free-growing white-flowered plant that is much used to put with cut flowers, to

²⁷ *Gypsophila elegans* Web. and *G. muralis* L., annuals, and *G. paniculata* L., a perennial.



ZINNIA

lighten the effect. It also tends to lighten the effect if used in mass plantings. The different species vary in height from 8 or 10 inches to 2 feet. The seed



FIG. 31.

should be sown in the open ground as soon as freezing weather is well past.

Calliopsis.—*Calliopsis*²⁸ is the name given to the annual plants of the genus *Coreopsis* that are used for ornamental planting. They have showy, graceful long-stemmed flowers (fig. 32) well suited for



FIG. 32.—*Calliopsis*.

bouquets and yet so borne as to make very effective border or bedding plants. The principal color is a deep yellow, which is combined in some varieties with rich maroons and in others with browns. Varieties vary in height from 9 inches to 2 feet. They are of the easiest culture.

Seeds may be sown under glass or in the open, but they should not be sown outdoors before the date of the last frost. They may be sown under glass two months before this. Seeds sown in the open in May will usually give an abundance of flowers from August till frost. After transplanting or their final thinning the plants should be

10 inches apart each way. The perennial form, *Coreopsis grandiflora*, will bloom the first year if the seed is sown early.

China aster.—The China aster²⁹ is certainly one of the most satisfactory of the annual flowering plants. The variety in its size, color, form, and season of blooming makes it a most satisfactory plant for

²⁸ *Coreopsis tinctoria* Nutt., *C. basalis* Blake (*C. drummondii*), *C. nuceensis* Heller (*C. coronata*).

²⁹ *Callistemma chinensis* Skeels (*Callistephus chinensis*).

supplying cut flowers; in fact, many of the improved sorts produce flowers equal in form and size to some of the better sorts of chrysanthemums. The range of color presented in this group is one of its chief merits. Strange as it may appear, the plant world is not very well supplied with blue flowers possessing characters which render



FIG. 33.—China asters in window boxes.

them suited to domestic or commercial uses. In the China aster, however, are found many shades of lavender and purple, and for this reason, if for no other, they should prove an attractive decorative plant. There are also white, pink, and rose-colored varieties. The habit of growth adapts the China aster to close planting for cut bloom, for window boxes (fig. 33), and also for bedding. It should not be con-

fused with the attractive native hardy perennial asters, which are robust tall-growing plants well adapted for use in an herbaceous border where late bloom and careless effects are desired. The more compact-growing large-flowered China asters are most desirable for cut blooms, while the tall-growing open wild aster³⁰ is most useful in wild gardens or for screens. The vigor and ease of culture of the China aster are factors which contribute to its popularity.

Plants from seed sown in the open ground in May and supplied sufficient moisture bloom abundantly in September and October, when the flowers are seen at their best. For July and August blooms the seeds should be sown in March or April. When frosts occur during this season the planting will need to be done in a coldframe, a spent hotbed, or in pots or boxes in a living room. Cover the seed about half an inch deep with rich light soil, and when the plants have three or four leaves transfer them to thumb pots or to other boxes, setting the plants about 2 inches apart each way. After all danger of frost is past transplant the plants so treated to their permanent home, where they should stand about 18 inches apart each way in well-prepared beds. Fresh manure or manure used in too large quantities sometimes proves injurious to them. Only thoroughly composted manure mixed with the soil is safe for these plants. Small quantities of air-slaked lime or of fresh wood ashes stirred into the surface of the beds are beneficial. When given plenty of water and rich, fine soil China asters can be grown into beautiful pot plants.

In some localities and during some seasons the China aster is seriously attacked by the so-called black potato beetle, or blister beetle,³¹ an insect which feeds upon the partly developed buds, causing them to develop, if at all, into deformed, irregular blossoms. In such localities these flowers can be successfully grown under screens of mosquito netting or other thin cloth.

Chrysanthemums.—The chrysanthemums, like the pinks, comprise some of the most valuable of the commercial florists' products, both hardy perennial and annual flowering plants. The large-flowered types of chrysanthemums, which each autumn produce such gorgeous shows in the stores, florists' establishments, and conservatories, are not hardy, and since they are treated as greenhouse plants by the florists, they are only mentioned in this list. The class of hardy chrysanthemums, which should be more commonly seen in every flower garden and are known as pompons, are simply noted to give proper relation to the annual chrysanthemums, which are the subject of this sketch.

Summer, or annual, chrysanthemums³² bloom most satisfactorily if the seeds are sown early in a hotbed or coldframe and the young

³⁰ *Aster novae-angliae* L.

³¹ *Epicauta pennsylvanica*.

³² *Chrysanthemum carinatum* Schousb., *C. segetum* L., *C. coronarium* L.

plants transferred to the open as soon as the soil has become sufficiently warm to keep them growing without check, or two weeks after the usual date for the last frost. If started in a hotbed the young plants should stand 10 to 12 inches apart when set in their permanent locations. Somewhat less satisfactory results can be secured by sowing the seed in the open where the plants are to bloom at or just before the date of the last frost. The seedlings should be thinned to stand at least 8 inches apart. If the same care in regard to disbudding and pinching back is taken with the annual plants as with the large-flowered perennials, the work will be rewarded by the greatly increased size of the usually white or yellow flowers. (Fig. 34.)



FIG. 34.—Summer chrysanthemum.

The hardy chrysanthemums³³ will bloom a little the first year from seed if started early, but the plants will not be compact and bushy until the second year. They should be started early in March, and where freezing is liable to

occur after planting they should be started under glass in order to give them time to mature before frost.

Cockscomb.—Cockscombs³⁴ are prized and planted as an easily grown odd and picturesque decorative feature of the garden (fig. 35). The tall ones form striking groups, and when interspersed with other

³³ *Chrysanthemum leucanthemum* L.

³⁴ *Celosia cristata* L.

lower growing plants in a border they produce a pleasing contrast, while the dwarf varieties make novel and attractive borders. There are bright red and crimson varieties. The young plants can be grown from seeds sown in gentle heat four weeks before the last frost and transplanted to the open ground when danger of frost is past, or about the time the last frost is expected the seeds may be sown in the open where the plants are to stand. Transplanting into rich soil as the combs begin to form makes the flower heads much larger.



FIG. 35.—Cockscomb.

They are bright from midsummer until frost.

Rudbeckia.—The rudbeckias, sometimes called cone-flowers, are principally perennials, but there is one annual³⁵ that grows about 2 feet high and bears handsome yellow flowers with a brown center (fig. 36). Not only is the disk brown, but the bases of the ray flowers as well. The seed may be sown in the open ground as soon as freezing weather is past, or for earlier bloom it may be sown under glass. The plants respond to plenty of manure, and they like warm,

sunny situations, although they will grow readily almost anywhere.

The hardy perennial rudbeckias³⁶ may be treated as annuals. The flowers are quite showy and usually have yellow rays, though some are crimson and others more or less covered with brown toward the base. The rudbeckias are very easy of cultivation, thriving in almost any soil and climate. Most of them prefer a moist soil, but will thrive in the garden under ordinary cultivation.

³⁵ *Rudbeckia bicolor* Nutt.

³⁶ *Rudbeckia hirta* L., *R. triloba* L.

The blackeyed-susan (*Rudbeckia hirta*), or "niggerhead" as it is sometimes called, will thrive in the hottest and driest situations. *Rudbeckia triloba*, a biennial, perpetuates itself through self-sown seeds. It may be used quite effectively as a border to a large bed of delphiniums or as a screen, as it forms a dense bush between 3 and 4 feet high. The rudbeckias are propagated from seeds or cuttings or by division. They are easily handled. When grown from seeds they may be sown in the open ground as soon as it is dry enough to work after freezing weather, or earlier with heat. The golden glow,³⁷ one of the most satisfactory hardy perennials, is well adapted for planting in a shrubbery or herbaceous border. It is propagated by division of the roots. It grows to a height ranging from 3 to 6 feet and may be used as a screen when lower growing plants are placed in the foreground.



FIG. 36.—*Rudbeckia*.

Gaillardia.—In the gaillardias,³⁸ or blanketflowers, are found both annual and perennial plants of easiest culture, offering a wide selection of varieties and a profusion of bloom over a long period. The blooming period begins early and continues late in the autumn. These are plants well adapted to mixed borders (fig. 37) and are very satisfactory as cut flowers. The stems are of good length, carrying the orange and crimson flowers well, while the cut flowers keep fresh for a long time when placed in water.

The annual gaillardias are all propagated readily from seeds sown where they are to grow soon after freezing weather is past, although they can be started under glass and be transplanted to their permanent location as soon as killing frosts have passed. In either case, the blooming plants should not stand closer together than 10 to 12 inches. They grow and bloom best when fully exposed to sun and air and when planted on a fertile but light and well-drained soil.

Lupines.—Lupines³⁹ (fig. 38) are blue-flowered hardy annuals of easy culture that succeed in partial shade. They grow about 2 feet high and are useful in mixed borders, in beds, and for cutting. They

³⁷ A double-flowered form of *Rudbeckia laciniata* L.

³⁸ *Gaillardia putchella picta* Gray.

³⁹ *Lupinus*, several species.

should be sown in the open ground as soon as the soil is fit to work, or earlier under glass.

African marigold.—The African, or Aztec, marigold ⁴⁰ is the taller of the two distinct types of garden marigolds, each with numerous horticultural varieties. Each type is derived from a different species. They are popularly spoken of as African marigold and French marigold, but their common names give no clew to their nativity. The former is not only the taller, but is more spreading in growth, and is well adapted to herbaceous or shrubby borders. It frequently grows



FIG. 37.—Gallardia.

2 or more feet in height, and for this reason it is better suited for planting in mixed borders or along belts of trees and shrubs than in beds or massed in small areas. This is the common marigold of the garden in America (fig. 39). The leaves and flowers are strong scented, while the range of color is from sulphur yellow to orange, the darker shades being more commonly met with than the lighter ones.

These plants may be started under glass or in the open ground as soon as freezing weather is past. They are of easiest culture.

Japanese bellflowers.—The platycodons, balloonflowers, or Japanese or Chinese bellflowers.⁴¹ are blue and white flowered hardy

⁴⁰ *Tagetes erecta* L.

⁴¹ *Platycodon grandiflorum* A. DC. and *P. grandiflorum japonicum* Stubenrauch.

perennials, which succeed fairly well as annuals. The seed may be sown as soon as freezing weather is past, and the plants will begin to bloom in about four months. They will thrive in any good garden soil, but are not as readily grown as many of the true annuals.

Salpiglossis.—The salpiglossis,⁴² or painted-tongue, is an unusually dainty and attractive funnel-shaped flower ranging from white to purple and crimson, more or less veined with gold, and borne on slender upright stems that give the whole plant an air of distinction (fig. 40). The seed should be sown early under glass or in the open ground as soon as danger of frost is past. It is not suited to bedding, but is beautiful in the border or for cutting. It is a little more difficult to grow than some of the other annuals.

Snapdragon.—The snapdragon⁴³ is a valuable border plant. It is a perennial, but flowers the first year from seed sown in the spring. The bright color and peculiar form of the flowers (fig. 41) always attract attention. The newer sorts offer an



FIG. 38.—Lupine.

enlarged variety of colors and of markings ranging from white to yellow and scarlet. The spikes are useful for cutting, keeping fresh a long time. From seed sown in the open ground when danger of frost is past blooms will be obtained in about 10 weeks. For early flowers the seed should be sown under glass and transplanted into beds of

⁴² *Salpiglossis sinuata* Ruiz and Pav.

⁴³ *Antirrhinum majus* L.

warm, dry soil moderately enriched. If protected by a coldframe or even a mulch of leaves in the North, the plants will winter well and bloom early the following year. The snapdragon, like most perennials and biennials which bloom the first year and of which a particular display is desired, should be treated as an annual and sown every year. The plant is of easy culture and blooms freely and continuously until frost.

Balsam.—The garden balsam ⁴⁴ is a native of India. It likes hot sun, rich soil, and plenty of water. The young plants are quick, sure



FIG. 39.—African marigold.

growers, and seeds sown in the open ground about the time of the last frost soon form handsome bushes thickly massed with large roselike white, pink, or rose-colored flowers (fig. 42). Transplanting two or three times has a tendency to dwarf the plants into better shape and and to make the flowers more double. Balsams are not often given room to perfect their development; they will easily cover from 12 to 18 inches of space each way. For the finest flowers choice seed is more than usually essential, as cultivation and selec-

tion have wrought wonders with this plant. The one objection to the balsam is its habit of producing its flowers on the under side of the leaves or inside the plant as it were. While the individual flowers are beautiful, the obscure manner in which they are borne detracts considerably from their ornamental value. When used at the margin of groups or to crown a terrace bank they are shown to best advantage.

For early blooms balsam seeds should be sown in a gentle hotbed or in a dwelling house about eight weeks before the last frost. As

⁴⁴ *Impatiens balsamina* L.

soon as the first true leaves have developed, the young plants should be transplanted to thumb pots or to boxes, where they will stand about 2 inches apart each way. An abundance of light and water is at all times necessary for success with these plants. Care should be exercised to prevent them from becoming drawn, as stocky, symmetrical plants produce the best flowers. They should be transplanted to the open when the weather has become warm, as they will not stand frost.

Poppy.—In the spring, even before tulips are fairly gone, old gardens begin to be gay with poppies.⁴⁵ No other plants possess so bold and brilliant a flower, coupled with the same grace of stem, airiness of poise, and delicacy of tissue. For beds and borders, with a background of green, there is nothing which will produce a more striking contrast than their white, pink, or scarlet flowers. Some sorts are admirable for naturalizing in open wooded grounds; others, like the beautiful Shirley poppy,⁴⁶ may be used for cutting, though these last only a few hours. A sandy loam suits poppies best.



FIG. 40.—*Salpiglossis*.

As their strong tap-roots are difficult to transplant, it is well to sow the seed where the plants are to bloom. Sowing seed just before winter and at intervals in the spring, the first sowing being while the ground still freezes at night, will provide a long succession of flowers. The seeds should be sown thinly and covered very lightly, as they are quite small. As soon as the young seedlings are well established the plants should be thinned to stand about a foot apart. The plants which bloom most profusely are those grown from fall or early spring sowings while the earth is cool and moist. They may be sown as

⁴⁵ *Papaver*, several species.

⁴⁶ *Papaver rhoeas* L.

early as the soil can be worked. They are well adapted to the use of the beginner.

Snow-on-the-mountain.—Snow-on-the-mountain⁴⁷ is a strong-growing hardy annual foliage plant whose attraction lies in the white borders to the bright green leaves (fig. 43). It is very showy in mass, but needs a



FIG. 41.—Snapdragon.

facing of other plants, as it is apt to form a broad head with few branches near the ground. Its flowers are inconspicuous.

The seeds of snow-on-the-mountain should be sown in the open ground when freezing weather is past, or earlier under glass. The plant is easily handled and will grow in almost any soil, but it makes the greatest growth where there is plenty of fertility and is the most showy on poor ground. It frequently reseeds itself.

**PLANTS GROWING ABOUT
18 INCHES HIGH.**

Plants that grow about 18 inches high are the globe ama-

ranth, four-o'clock, godetia, Job's-tears, mignonette, rose everlasting, and stock.

Four-o'clock.—The four-o'clock,⁴⁸ sometimes called the "marvel-of-Peru," is normally a perennial in its native region, the warmer parts of America, but under garden culture gives satisfactory results when treated as an annual (fig. 44). The seed may be sown under glass

⁴⁷ *Euphorbia marginata* Pursh.

⁴⁸ *Mirabilis jalapa* L.

and the plants set out after danger from frost is past. The four-o'clock is often used as a low screen with good results. The colored part of the flower is white, various shades of red and yellow, and striped.

The plant is a quick-growing, erect, bushy herb that is easily han-



GARDEN BALSAM



FIG. 42.

dled, and attains a height of 18 inches. Its blooming period is during the late summer and autumn. Because of its habit of opening its flowers only late in the afternoon and on cloudy days the popular name four-o'clock has been given to it. While this plant is a tender annual in the northern part of the United States, it often reproduces itself from self-sown seed, and even as far north as New York City it frequently manifests its perennial habit

of developing tuberous roots sufficiently large to be lifted and stored like those of the canna.

Godetia.—The *godetia*⁴⁹ is a close relative of the evening primrose. The native California *godetias* are spoken of as “farewell-to-spring.” It is a choice free-blooming annual with widely open flowers (fig. 45) of satiny texture and delicate rose, light purple, and white. They are suited for solid beds, border lines, for pots, and to grow in shrubbery borders in shaded places where few other flowers will flourish. The seed should be sown in the open or in a coldframe in spring. If the latter, the seedlings should be transplanted to stand about a



FIG. 43.—Snow-on-the-mountain.

foot apart in rather thin or sandy soil. These plants are successfully treated as biennials by sowing the seed in July and in the North transplanting the young plants to a coldframe, to be placed in the open the following May. The blooming season is from early spring until frost, and the average height of the plants is 1½ feet.

Globe amaranth.—The globe amaranth,⁵⁰ sometimes called bachelor's-button, is an attractive and useful bedding plant growing

to a height of 12 to 24 inches. The flowers are predominantly red and somewhat resemble clover heads (fig. 46). They are often cut as everlasting. The seeds should be sown in the open ground soon after freezing weather is past, or they may be started under glass if desired.

Job's-tears.—Job's-tears⁵¹ is a grasslike annual, suggesting diminutive corn in its habit of growth (fig. 47). Its chief attraction is the beautiful seeds that are often used as beads. The plant itself is graceful, though not attaining a height of over 18 inches in the North. In the South it grows much larger, even being suggested as a forage crop.

⁴⁹ *Godetia amoena* Lalja.

⁵⁰ *Gomphrena globosa* L.

⁵¹ *Coix lachryma-jobi* L.

About the date of the last frost, seed should be sown where the plants are to grow. Two or three plants may grow together in clumps 8 to 10 inches apart.

Mignonette.—Every indoor or outdoor garden must have mignonette⁶² in plentiful supply. The seed can be sown at any time, and if successive plantings are made its fragrant modest-colored flowers (fig. 48) may be gathered outdoors until November. It is of easy culture. For early blooms in the open, seed should be sown in pots or boxes under glass eight or ten weeks before danger of frost is over



FIG. 44.—Four-o'clock.

and the seedlings thinned or potted off to make stocky plants for bedding out as soon as severe frosts are past. To insure a succession of bloom throughout the season, sow a row or two at a time in the open about two or three weeks before time for the last frost, repeating regularly at intervals of about three weeks until August. The July sowing will make good winter-flowering plants. The average height of mignonettes is from 9 to 18 inches.

⁶² *Reseda odorata* L.

Rose everlasting.—Rose everlasting,⁵³ listed in florists' catalogues as *acroclinium*, is attractive in a mixed border and can also be cut as an everlasting. Its flowers are white or rosy pink, and the plant grows to a height of about 15 inches. It should be sown in the open ground

after the heaviest frosts are past.

Stock.—The group of plants known as stocks⁵⁴ offers many desirable qualities. The plants are easily grown, vigorous, have good habits (fig. 49), fragrant flowers in various colors, a long season of bloom, and are adapted to a wide range of cultural conditions. Stocks are suitable for bedding, edgings, pot culture, house or conservatory use, and for cutting. For bouquets and floral work the double white sorts are especially useful, although there are also rose, purple, crimson, and other colors. To secure early flowers, seeds should be sown under glass before freezing weather is gone and the young seedlings transplanted when an inch high into other pots or boxes or into the fine soil of a spent hotbed. Advantage should be taken of showery weather, as

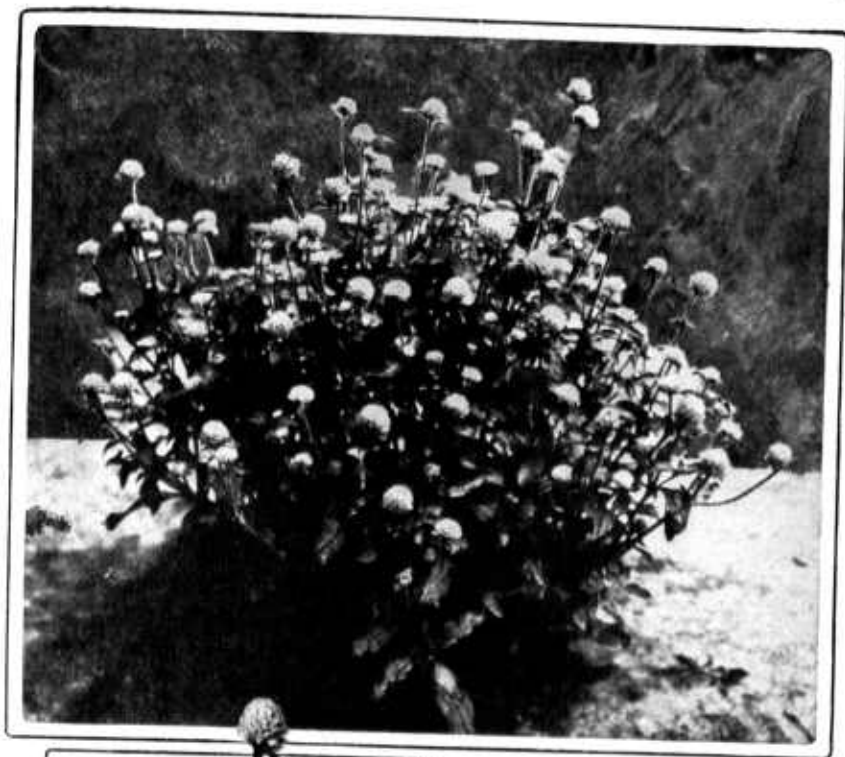


FIG. 45.—Godetia.

soon as danger from frost is past, to transfer the plants to garden beds of deep rich soil, setting them about a foot apart each way. As with other plants, frequent transplantings during the early

⁵³ *Helipterum roseum* Benth. and other species.

⁵⁴ *Matthiola incana* annual Voss.



GLOBE AMARANTH

stages of growth
tend to give them
a more dwarf and
compact habit.

For late flowers
seed sowings may be made
in the open ground a little
before the last frosts may be
expected. If plants that be-
gan to bloom late are care-
fully lifted and potted in the
fall they will flower freely
during the winter in a house
or room that is tolerably cool
and moist. The blossoms are
very lasting. The average
height of the stocks is from
12 to 18 inches.

FIG. 46.

PLANTS GROWING ABOUT 12 INCHES HIGH.

Plants that are 12 inches high and of upright growth are the calendula, some dwarf varieties of calliopsis, candytuft, Cape mari-

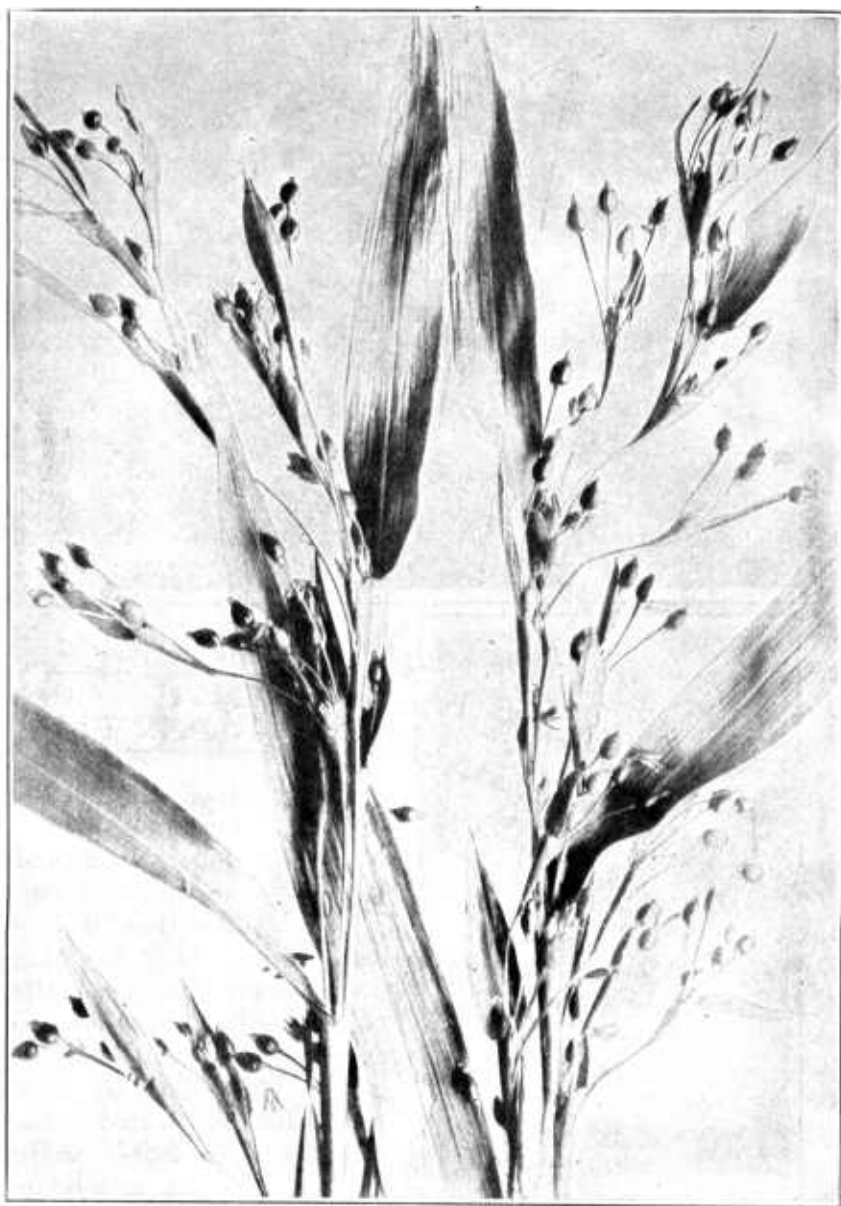


FIG. 47.—Job's-tears.

gold, French marigold, annual (or Drummond) phlox, pink, Iceland poppy, and nemophila, while the California poppy and petunia are

spreading and will grow much farther than 12 inches, though they will not get higher than this unless supported in some way.

Petunias can be trained on a support to a height of 3 feet or more, but the California poppy can not be handled in this way because of its tender stems that do best resting on the ground.

Miniature sunflowers about 1 foot in height may also be obtained.

Calendula, or *pot marigold*.—The calendula,⁵⁵ or pot marigold, is a hardy annual about 1 foot high. A moderately rich light soil is most congenial to these plants, but they are readily grown almost anywhere. They should be placed about 8 or 10 inches apart if planted in masses (fig. 50) or in borders. The seed may be sown in the open ground quite early in the spring, and the plants will be in bloom early in summer and continue to bloom until late in the autumn. The coloring of the

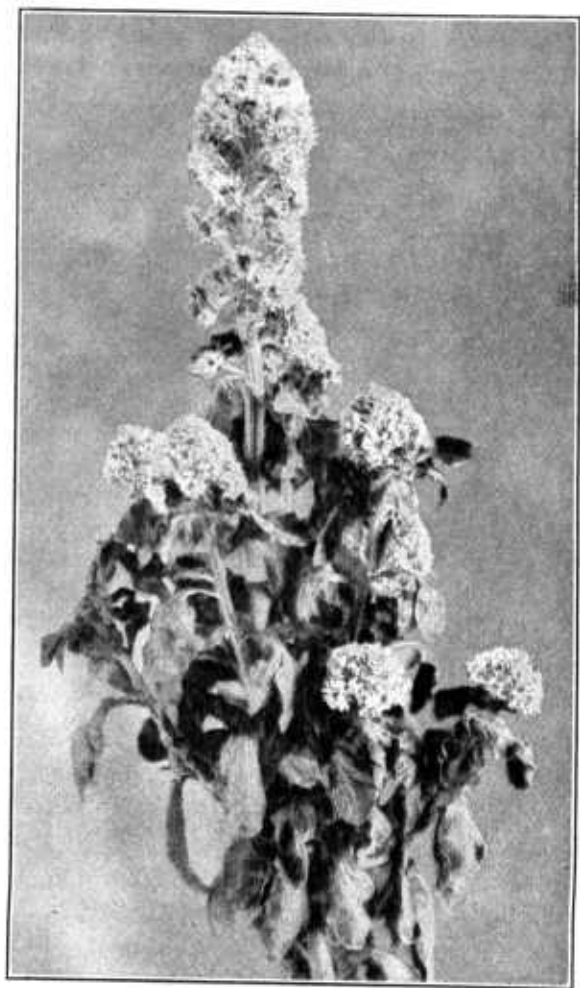


FIG. 48.—Mignonette.

flowers ranges through all shades of yellow, from ivory to deep orange. The plants bloom freely and earlier than the marigold and are useful in beds, borders, or backgrounds. The dried flowers are sometimes used for flavoring soups and stews. There are both single and double forms of the pot marigold. One of the most satisfactory methods of propagating this plant is from seeds sown about six weeks before danger of frost is past in spent hotbeds or in coldframes. About or a little after the date of the last frost it will

⁵⁵ *Calendula officinalis* L.

be safe to transfer the young plants to their permanent summer quarters.

Candytuft.—Candytuft ⁵⁶ is among the best of the white flowers for edging beds (fig. 51); for planting in belts, beds, or for massing; for rockeries; and for cutting. Several of the varieties are fragrant; all are profuse bloomers and are easily grown. There are also crimson, carmine, and lavender varieties. Soon after freezing weather

is past the seed should be sown outdoors where the plants are to bloom. They should be well thinned when they have grown about 1 inch high. A second planting should be made a month later, and a third late in July for fall flowers. September sowing will give winter-blooming plants. The soil for best results should be rich and the plants given an abundance of water. They branch freely, and if some of the buds are removed the flowers remaining will be larger.

Cape marigold.—The Cape marigold,⁵⁷ also called African golden daisy (fig. 52), is an attractive orange to deep-yellow showy flower,



FIG. 49.—Stock.

growing 1 foot or more high and as broad. It is especially adapted to dry sunny locations. Seed should be sown outdoors after freezing weather is well over, or it can be sown earlier under glass and be transplanted to flats or pots and then set in the open ground after danger from frost is past.

⁵⁶ *Iberis umbellata* L., *I. amara* L.

⁵⁷ *Dimorphotheca aurantiaca* DC.

French marigold.—The French marigold ⁵⁸ (fig. 53) is more compact and regular in growth than the African marigold and consequently is more valuable as a bedding or low border plant. The habit of growth is erect and compact, with good foliage. The flowers are well formed, of bright yellow and orange colors, and occur from June until frost. While these plants can be grown easily and successfully brought into bloom from seeds sown in the open after

danger of frost is past, they do not give as early bloom or the profusion of flowers which will be borne by plants that are started in a house and shifted for a time into pots, which confine the roots and check the plant, so that when set in the open ground the increased food supply will have a tendency to induce the development of flowers rather than wood, a tendency which will be likely to be maintained throughout the season. When transferred to the open the plants should be set at least 1 foot apart each way. The same distance should also be given the plants grown from seed sown in the open. There



FIG. 50.—*Calendula*.

are both double and single forms of the French marigold. The named varieties are especially good, but very satisfactory results are obtained from mixed seeds.

Phlox.—The annual, or Drummond, phlox ⁵⁹ is particularly useful and attractive when sown in masses or ribbon beds of contrasting colors. Few annual plants are more easily grown from seed, give a

⁵⁸ *Tagetes patula* L.

⁵⁹ *Phlox drummondii* Hook.

quicker return of bloom, or offer such a variety to choose from as do the phloxes. They are rich in reds, with a few varieties approaching buff and lilac (fig. 54). If given good soil, plenty of water, and full sunshine, they furnish throughout the season a supply of delicate flowers for cutting. The phloxes are also useful as window-garden plants and may be used as an undergrowth for tall bare-stemmed plants. The first sowing of seed should be made as soon as frost is out of the ground in the spring; another a month later, either where the



FIG. 51.—Candytuft.

plants are to bloom or in a seed bed, as the phlox transplants readily. In transplanting set the taller kinds about a foot apart. If planted too thickly they suffer from mildew. The removal of flowers and seed pods makes the plants more bushy and compact and lengthens their blooming period. The average height of the plants is about a foot.

Pinks.—The large and varied genus of *Dianthus* contains some of our most beautiful and most profitable flowers (fig. 55). Most are hardy perennials that

bloom freely the first season, the plants remaining green all winter and blossoming the next year if lightly protected by a mulch of straw, cut fodder, or leaves. Old plants flower earliest, but as young ones give the largest, finest flowers, sowings are made every year. Seed can be sown under glass or in an open sheltered bed as soon as the frost is out of the ground. The seedlings are easily transplanted and should stand 8 to 12 inches apart; dwarf ones, about 6 inches. If especially large brilliant flowers are desired, a bed of well-mixed turfy loam, leaf mold, and well-decayed manure should be prepared for them. Good drainage should be provided, as

the plants are impatient of too much moisture and are more liable to winterkill in moist than in well-drained situations; in fact, the plant is hardy to severe cold, but succumbs when exposed to low temperatures in wet places.

The flowers of all the plants of this group are most satisfactory for bouquets and table decorations because of the length of time they will keep in a fresh and attractive condition after being cut and placed in water.

Their colors are chiefly white and shades of red.

The carnation pink,⁶⁰ which is the forcing carnation of the American florist, can be grown from seeds, but it usually will not bloom until five months or more from planting. The seeds should be sown very early in the season in hotbeds, the young plants being given frequent shifts to pots of increased size as they grow until all danger of frost is past and the growing season is well on, when they may be transferred



FIG. 52.—Cape marigold.

to the border where they are to bloom. If they are given a rich soil and an abundance of moisture the blooms will more than repay the extra trouble taken, but they are not to be counted on for very satisfactory results until the second season. Seedling plants are more variable in character than plants propagated from cuttings, and for that reason seedlings are not used by florists except in seeking for new varieties.

On the continent of Europe this type of dianthus is more commonly used as a garden annual than in America. The form known as the "Marguerite carnation,"⁶¹ which has recently come into popular

⁶⁰ *Dianthus caryophyllus* L.

⁶¹ A hybrid derived from *Dianthus chinensis* and some other species.

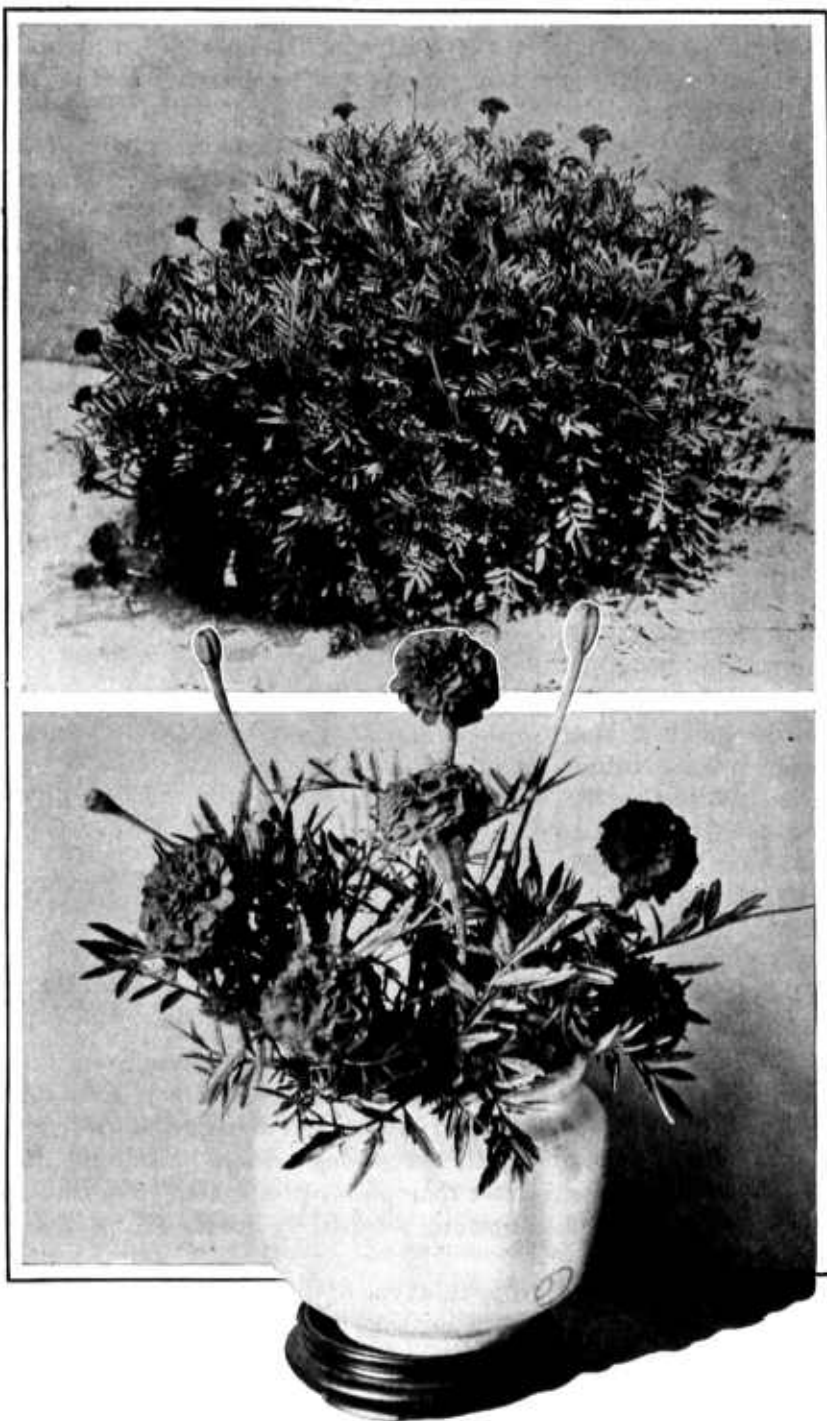


FIG. 53.—French marigold.

favor, is well adapted to cultivation as an annual. Most of its flowers come double, and it has a pleasing habit of growth.

The hybrid sweet-william⁶² is one of the most satisfactory members of this group for annual planting. While seed can be sown in the open about the time frosts are over, the best results in the way of early bloom come from plants produced from seeds sown in a hotbed not later than six weeks before the last frosts, the young plants being pricked out into flats or, preferably, into thumb pots, and later shifted to 3-inch pots before planting in the flowering border. The outside planting of hotbed-grown plants should be delayed until the season has advanced sufficiently to prevent the plants

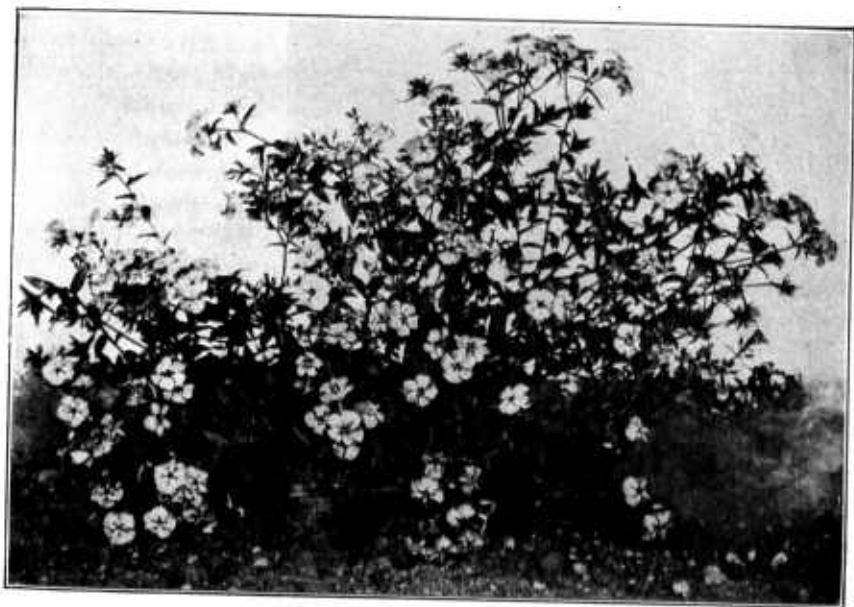


FIG. 54.—Drummond phlox.

from suffering from a check by cold after being placed in the open. The pot-grown plants should be set at least 10 inches apart, and seedlings from seeds sown in the open had best be thinned to stand at least 8 inches apart.

The sweet-william⁶³ of old-fashioned gardens is a perennial, or at least a biennial, and needs to be sown in the summer for satisfactory results the following year.

One of the handsomest, easiest grown, and most satisfactory annual pinks is the Japanese pink.⁶⁴ Seed sown early under glass or outdoors as soon as the ground is settled will give blooms by midsummer or before, and the plants will continue blooming until frost. Seed

⁶² *Dianthus latifolius* Hort.

⁶³ *Dianthus barbatus* L.

⁶⁴ *Dianthus chinensis hedderwigii* Regel.

sown later will give some very late blooms and an abundance of fine flowers the next spring. There are both single and double varieties.

The Chinese pink,⁶⁵ which is somewhat similar to the Japanese pink, is also a satisfactory plant handled in the same way. The varieties usually offered are double.

The fringed pinks,⁶⁶ both single and double, are admired by many and are easily grown, satisfactory plants that do best in poor soil with plenty of sun.

The Scotch pink,⁶⁷ or grass pink, is a hardy dianthus which, when treated as an annual, like the hybrid sweet-william, gives very satisfactory results. The delicately fringed variously colored pink and

white fragrant flowers give the plant an odd yet attractive appearance.

Nemophila.—The representatives of the genus *Nemophila*⁶⁸ are dwarf, compact-growing, hardy annual herbs, about 12 inches in height, which produce an abundance of showy, bell-shaped flowers from early spring to late autumn, for which reason they are esteemed for borders and for bedding purposes.



FIG. 55.—Japanese pink.

All the species may be propagated from seed. For summer and late fall blooms the seed may be sown in the open as soon as freezing weather is past, the plants being left without transplanting. The nemophilas love a cool, moist loam with partial shade and produce an abundance of showy blue, violet, and white margined and dotted flowers, which are very valuable for bedding and for cut flowers. These plants are especially adapted to the cooler parts of the country or for winter culture in the South. If the seeds are sown in the open about the middle of August and the seedlings transplanted in late autumn, very early flowers may be obtained.

⁶⁵ *Dianthus chinensis* L.

⁶⁶ *Dianthus chinensis lucinatus* Regel.

⁶⁷ *Dianthus plumarius* L.

⁶⁸ *Nemophila menziesii* Hook. and Arn.

Poppies.—The Iceland poppy⁶⁹ is a dainty and attractive perennial that comes into bloom almost as soon as the true annual poppies (fig. 56). It grows about a foot high and bears its yellow, white, and deep-orange flowers on slender, graceful stems. If cut before opening, the blossoms keep quite satisfactorily. If the dead blossoms are kept picked off, the plants will continue to blossom the whole summer. Seeds are best sown where the plants are to grow, as early in the spring as the ground can be worked. The plants should be thinned to about a foot apart.

The California poppy⁷⁰ is the State flower of California and an annual of striking character (fig. 57) as regards both the form and the color of its flowers, which are bright and rich in their tints of yellow and orange. The plants average about a foot in height, have attractive silvery foliage, and produce their large poppylike flowers quite lavishly from early spring until frost. They are most effective when grown in beds of considerable size, over which the seed may be thinly sown broadcast and then lightly raked in. These sowings may be made early in the spring or late in the fall for early germination and bloom the next spring. The California poppy is also very useful as a pot plant and for cut flowers. It is easily grown.



FIG. 56.—Iceland poppy.

Petunia.—Because of the ease and facility with which all of the single-flowered varieties of the petunia⁷¹ can be grown from seed, this plant commands attention as a worthy candidate for the summer flower garden (fig. 58). The young plants grow rapidly and come into bloom early, and in addition to this they furnish a continuous wealth of blossoms until destroyed by frost. The large-flowered

⁶⁹ *Papaver nudicaule* L.

⁷⁰ *Eschscholtzia californica* Cham.

⁷¹ *Petunia axillaris* B. S. P. (*P. violacea*).

strains are very beautiful and of great variety. While the single sorts are common and inexpensive, the double giant-flowered varieties are rendered expensive because they must be reproduced from seed which sets only after careful hand pollination of the flowers, which is in itself an expensive operation, or from cuttings, of which an individual plant can supply but a limited number. The colors



FIG. 57.—California poppy.

range from white through rose to almost purple.

For the best results the seeds of all sorts should be sown in a gentle hotbed, coldframe, or in fine soil in a box placed in a sunny window before or by the time freezing weather is over. When the soil has warmed sufficiently and the danger of frost has passed, the seedling plants should be transplanted to a rich garden loam and placed about a foot apart each way. The seed of the double varieties is less vigorous than that of the single sort; therefore, to insure good germination, it requires

more attention to prevent extremes of temperature and of moisture. If the seeds are sown in boxes in a living room, a pane of glass may be kept over the top to maintain a close atmosphere and thus prevent the loss of moisture until the young plants are well out of the ground. In planting, the seeds should be scattered over the surface of the soil and brought in contact with it by firming. They should not, like most other seeds, be covered. In transplanting, the weaker, slower growing seedlings should not be ignored, as they are likely to be the plants that will produce the finest blossoms.



Petunias are attractive in beds and masses, serve well for broad borders or bands, and thrive well in window boxes. They are not exacting as regards soil conditions, thriving well in almost any arable soil, and they endure drought well and bloom profusely.

PLANTS LESS THAN 12
INCHES HIGH.

There are several
desirable annuals for

PETUNIAS

ornamental planting that do not grow to a height of a foot. Among these are the ageratum, lobelia, dwarf nasturtium, pansy, portulaca, sweet alyssum, tagetes, forget-me-not, and verbena, while the cockscomb has dwarf varieties less than a foot in height.

Ageratum.—"For strengthening the garden's color forces in blue, no annual is so good as the



FIG. 58.

ageratum."⁷² Though ordinarily used in bedding and borders in contrast with such plants as geraniums, perillas, amaranthus, etc., the rose, white, and blue ageratum are exceedingly attractive when mingled with alyssum, candytuft, and similar plants. They grow well upon almost all soils and through a wide range of climate; for that reason many combinations with them are possible. The plants are easily grown, neat, bushy, and erect, with



FIG. 59.—Ageratum.

ing little plants that bloom very quickly from seed and continue gay with flowers all through the season. For beds, edgings, baskets, and pots there is nothing prettier; their clear white and shades of blue and generous bloom make them welcome anywhere (fig. 60). The seeds may be sown outdoors in early spring where the plants are to grow. As the plants appear they should be thinned moderately or transplanted several inches apart in rich open soil.

a continual profuse clustering of pretty brushlike flowers (fig. 59) throughout the season. The dwarf blue sorts make fine borders and are much used where contrasting color effects are desired. For early results the seed should be sown in cold-frames or boxes in the house early in the season before freezing weather is past, but for summer and fall blooms the seeds may be sown in well-prepared beds in the open after the ground stops freezing. Seeds sown in August will produce good plants for winter flowering.

Lobelia.—The lobelias⁷³ are charm-

⁷² *Ageratum conyzoides* L., *A. houstonianum* Mill.

⁷³ *Lobelia erinus* L.

Liquid manure applied while they are in bloom greatly improves the flowers. Many sorts are also good winter conservatory plants of trailing habit. There are perennial or tall varieties that are handsome, showy plants with red or with blue flowers, quite effective for backgrounds and grouping.

Dwarf nasturtium.—A wide range of color has been developed in the dwarf, or Tom Thumb, nasturtium,⁷⁴ which for three or four months of the season makes a better display than almost any other plant (fig. 61). No annual will produce such a profusion of flowers

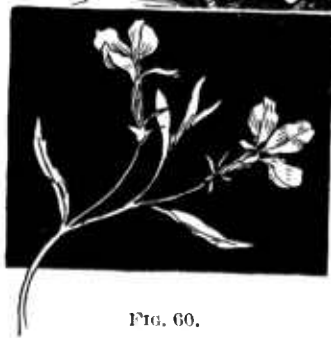


FIG. 60.

LOBELIA

for so long a time with the same outlay of time and

labor. The maximum of bloom is produced on thin soil, and the plant never flags through the hottest weather; in fact, too much rain or moisture greatly reduces the supply

of flowers. In soil too rich the leaves predominate and the plants are apt to rot off in wet weather, especially if standing too close. The seeds should be planted an inch deep just after the last frost, and the seedlings should be thinned to 10 or 12 inches apart. The rows should be not less than a foot apart.

These plants have a neat, compact habit of growth and attractive foliage and are not infested by insects. Blossoms appear in two months from the date of seed sowing and continue throughout the whole season. A bed of dwarf nasturtiums in full bloom is a sea of yellow and orange, mixed with browns, maroons, and lemon. It

⁷⁴ *Tropaeolum majus nanum* Hort.

is said that a good bed, 6 by 20 feet in size, will yield about 1,000 flowers each day. The average height is 9 inches.

Pansy.—The pansy,⁷⁵ sometimes called heartsease (fig. 62), is a favorite with almost everyone. The flowers are usually yellow or purple, sometimes almost white or almost black, but usually more or less splotched. The pansy is a plant that demands more than ordinary attention, but none repays such attention more liberally. For very early outdoor bedding the seed is sown in the autumn (September) in a coldframe or in rich moist garden beds, from which the plants can be transferred before severe winter weather



FIG. 61.—Nasturtium.

begins. South of Cincinnati and St. Louis the transplanting can be to the beds where they are to bloom. North of these cities they should be transferred to a coldframe, setting them 2 or 3 inches apart each way. In the spring three-fourths of them can be lifted out for bedding and the rest left to bloom in the frame. For winter bloom in a frame set the plants about twice as far apart and thin out half of them in the spring. Cover the blooming plants with sash, adding a covering of matting or straw in very cold weather. In mild weather remove the mats and tilt the sashes to admit light and fresh air and to prevent the plants from becoming drawn. In outdoor beds raised a few inches above the ground, with a mulch of dry leaves and some brush to hold them in place, pansies will often winter

⁷⁵ *Viola tricolor* L.

nicely in the North and bloom until midsummer, when a relay of young vigorous plants should be ready to replace them.

Spring sowings should be made early, so as to secure good flowers during the early rains. Seeds sown in a cool, moist place in June and July and well tended will give good flowering plants for fall. If they come into bloom in the heat of the summer, the flowers may be small at first; but as the weather becomes cooler they will increase in size and beauty. Through the summer heat the flowers are finer in a somewhat shaded place, but in almost any situation good pansy seed will produce fine flowers in spring and fall. Early fall sowings give the finest spring flowers.



FIG. 62.—Pansies.

In the South much better results may be expected with these plants in the winter than in the summer.

Portulaca.—The bright-flowered thick-leaved portulaca,⁷⁶ sometimes called sun plant, is unrivaled for brilliancy among plants of low growth. It possesses the ability to flourish under extremely adverse conditions; even the hot sun and a light sandy soil with sparse water supply will not destroy it. It is satisfactory for beds, edgings (fig. 63), and rockwork, and for filling up irregular spaces or unexpected gaps in flower beds; as an undergrowth for taller plants it is also valuable. It carpets the ground with a mat of

⁷⁶ *Portulaca grandiflora* Hook.

succulent foliage that in the forenoon is hidden by the gayest flowers, ranging through the reds and yellows. The plant is particularly useful in the Northwest. The seed does not germinate until hot weather and should be sown late. Beyond the sowing this plant requires little care. The hardy character of the plant is shown by the fact that it can be transplanted while in full flower through the driest, hottest seasons. The average height is 6 inches.

In the southern half of the country portulaca will perpetuate itself by self-sown seeds. In some soils this is sufficient to cause the plant to assume a weedy character. It never becomes troublesome like its near relative, the weedy garden purslane, or "pusley" (*Portulaca ohracea*).

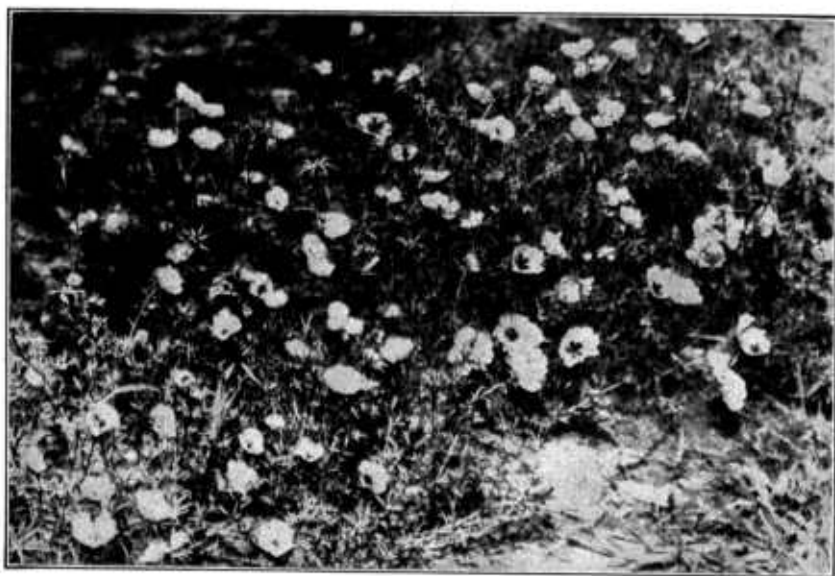


FIG. 63.—Portulaca.

Sweet alyssum.—Sweet alyssum⁷⁷ is a most easily grown, dainty little white flower, recommended to be used liberally for borders, edgings, baskets, pots, rockwork, and for cutting (fig. 64). For borders the seed should be sown thickly, so as to form masses. For winter bloom sow late in August and thin the seedlings to stand about 4 inches apart, but for spring bloom for borders the seeds should be sown in the open early in the spring, or even late in the preceding autumn in some localities. Where the plant will not endure the winter, however, early spring planting under cover, either in a coldframe, a spent hotbed, or in boxes in a dwelling, is most to be relied upon. Sweet alyssum can also be increased from cuttings

⁷⁷ *Lobularia maritima* Desv. (*Alyssum maritimum*).



made from strong new side shoots, as well as by division of the roots. By cutting back after the first flowers fade others will be produced.

The Carpet of Snow variety is only about 4 inches high and is probably one of the most satisfactory, as its habit of growth is so compact that blooms that die during the season do not give it the ragged appearance sometimes seen in the larger varieties. It blooms continually from spring till fall. While sweet alyssum is white, there are perennial varieties that are yellow.

SWEET ALYSSUM

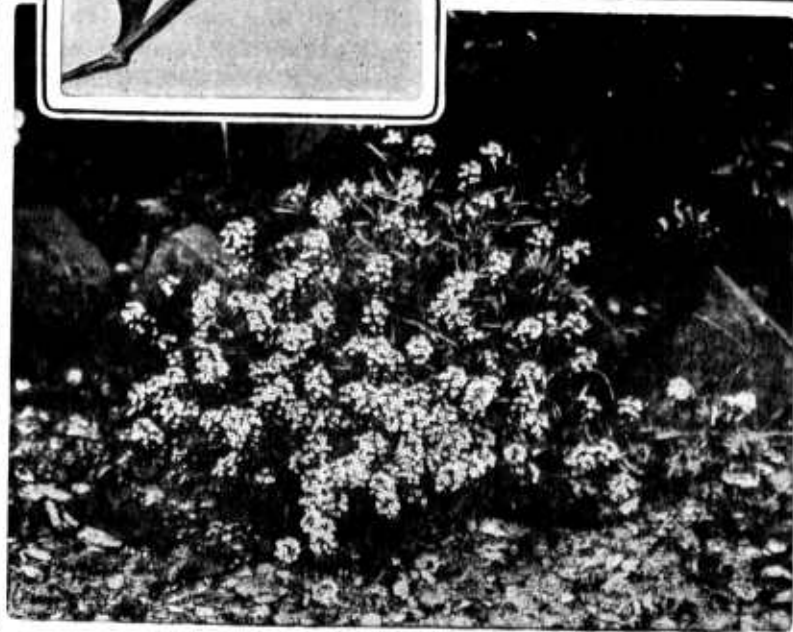


FIG. 64.

Dwarf marigold.—Dwarf marigold,⁷⁸ or as it is frequently listed in catalogues "Tagetes," is the very dwarf, compact single marigold with almost fernlike leaves. The plants are scarcely more than 8 inches tall and bear freely their bright yellow blossoms. They can be started in the open ground soon after freezing weather is past and are readily grown.

Verbena.—The verbena⁷⁹ is a low-growing annual with a creeping habit. The flowers are borne on terminal or lateral shoots which lift themselves from 5 to 7 inches off the ground, and when grown in mass the plants will form a mat that in full bloom will give the soil the appearance of having a carpet of flowers. Because of the ability



FIG. 65.—Verbena.

of the plant to form a compact growth and produce a wealth of flowers over a long period, the verbena is frequently used as a bedding plant where carpet-bedding effects are desired. The contrasting colors in the varieties, which come true from seed, allow the securing of pleasing combinations which are effective where low-growing plants can be used. The colors include white, pink, scarlet, blue, and purple. The length of stem and the texture of the flower (fig. 65) are such that the verbena is of value for bouquets and table decorations. It can be used with good effect in beds, borders, mounds, and window boxes.

While the verbena grows readily from cuttings and from layers, seedling plants are more vigorous and as a rule produce better flowers. For the earliest bloom, sow the seeds at least a month before the ground stops freezing at night, starting them in a moderately warm living room or greenhouse. For general outdoor planting the seeds may be sown about five or six weeks before the last frost either in a living room, hotbed, or greenhouse. Soak the seeds a few hours in tepid water and sow in seed boxes filled with light rich soil; cover one-fourth of an inch deep, press down firmly, and water sparingly. When the seedlings are about an inch high transplant them into other boxes, placing the young plants 2 or 3 inches apart each way. If thumb pots are available, use these in place of boxes. When all

⁷⁸ *Tagetes signata pumila* Hort.

⁷⁹ *Verbena chamaedryfolia* Juss., *V. phlogiflora* Cham., *V. teucrioides* Gill. and Hook., *V. incisa* Hook.

danger of frost is past choose a bright, sunny situation in which to plant them. Make the soil rich and compact rather than light, but in all cases provide good drainage. Set the young plants 10 to 15 inches apart each way and give good cultivation until they cover the ground. With such treatment the verberna should give continuous bloom from early summer until killed by frost.

Forget-me-not.—The dainty little blue flowers commonly known as forget-me-nots⁸⁰ (*Myosotis*) are hardy perennials that love cool, moist soils and, like pansies, bloom most freely in fall and early spring. There is also an annual species, with several varieties. They make a satisfactory close border (fig. 66), the beauty of which is



FORGET-ME-NOT

heightened by abundant bloom. The forget-me-not is also satisfactory as a winter-blooming plant for growing in cool rooms or coldframes. Another feature characteristic of this plant is that, after once having been introduced

into a garden, it perpetuates itself from year to year by self-seeding, like the poppy, portulaca, and several other desirable annuals. Sow the seeds in spring in a warm, sunny border, or in the South in late summer for winter bloom. Most varieties bloom freely the first season and profusely the second year if in a sufficiently cool, moist place. The average height of the plants is 6 inches. They do not succeed so well in dry, sunny situations.

⁸⁰ *Myosotis scorpioides* L. (*M. palustris*).

PLANTS FOR SPECIAL SOILS OR CONDITIONS.

Some plants which are desirable for special conditions are specified in the following lists:

For bright sunshine with plenty of fertility and moisture: Over 4 feet high, castor-bean, cosmos, sunflower, sorghum, fetterita, milo, and Indian corn; over 3 feet, Joseph's-coat, love-les-bleeding, plumed cockscomb, orange sunflower, prince's-feather, spiderflower, and summer cypress; 30 inches, cornflower, larkspur, mourning bride, scarlet sage, strawflower, and zinnia; 24 inches, balsam, calliopsis, China aster, summer chrysanthemum, cockscomb, coneflower, four-o'clock, galliardia, African marigold, platycodon, poppy, salpiglossis, snapdragon, and snow-on-the-mountain; 18 inches, Job's-tears, mignonette, and stock; 12 inches, calendula, California poppy, calliopsis, candytuft, French marigold, petunia, Drummond phlox, pink, and Iceland poppy; under 12 inches, ageratum, cockscomb, lobelia, portulaca, sweet alyssum, and verbenia.

Of easiest culture under ordinary garden conditions: Over 4 feet, sunflower; about 3 feet, Joseph's-coat, love-les-bleeding, heliopsis, and prince's-feather; about 30 inches, cornflower, strawflower, and zinnia; about 24 inches, calliopsis, summer chrysanthemum, coneflower, galliardia, marigold, poppy, and snow-on-the-mountain; about 18 inches, mignonette; about 12 inches, Cape marigold, calendula, California poppy, balsam, candytuft, petunia, Drummond phlox, plak, dwarf nasturtium, portulaca, and sweet alyssum.

On light fertile soil: Galliardia, marigold, Drummond phlox, and portulaca.

On light soil, not too rich: Cockscomb and feather cockscomb.

On poor soil: Love-les-bleeding, prince's-feather, Joseph's-coat, Cape marigold, godetia, dwarf nasturtium, portulaca, Scotch pink, sweet alyssum, garden balsam, and calliopsis.

On lands near the seacoast: Plants from the three foregoing lists, depending on the fertility of the soil, together with the castor-bean, sunflower, heliopsis, spiderflower, cornflower, strawflower, zinnia, calliopsis, snow-on-the-mountain, four-o'clock, stock, calendula, California poppy, petunia, and sweet alyssum.

In partial shade: Basketflower, sweet-sultan, clarkia, platycodon, godetia, Drummond phlox, pansy, sweet alyssum, lupine, and forget-me-not.

Especially responding to rich soil: Castor-bean, scarlet sage, balsam, and China aster.

To cut for everlasting: Rose everlasting, feathered cockscomb, globe amaranth, and strawflower.

Not adapted to the South except for late fall and early spring: Salpiglossis, pansy, and forget-me-not.

Plants that can be started to advantage in hotbeds and coldframes for early flowering, whether they are to be used for bedding purposes or for cut flowers: Ageratum, China aster, calliopsis, castor-bean, calendula, cosmos, cockscomb, chrysanthemum, godetia, lobelia, marigold, petunia, Scotch pink, scarlet sage, spiderflower, and verbenia.

Some plants that may be sown in beds in the open ground and later transplanted to their permanent locations are the ageratum, calendula, calliopsis, China aster, clarkia, cockscomb, dahlia, galliardia, godetia, lobelia, mignonette, pansy, pink, snapdragon, spiderflower, stock, and zinnia.

Among those that should be sown early in that way are the alyssum, California poppy, candytuft, cornflower, forget-me-not, mignonette, nemophila, Drummond phlox, sunflower, poppy, and sweet alyssum.

Most of these may be sown earlier in a hotbed or coldframe and thus be made to bloom earlier.

Some should be sown in the open ground where the plants are to grow. Among those that should be sown late in this manner after the ground is warm are the castor-bean, sorghum, millo, feterita, Indian corn, garden balsam, portulaca, and four-o'clock.

For August and September sowing: Forget-me-not, pansy, cornflower, pink, and snapdragon.

Seeds that may be sown on well-prepared ground just before winter for early spring germination or on fall-prepared ground very early in the spring while the soil still freezes at night are the poppy, cornflower, cosmos, summer cypress, larkspur, snapdragon, snow-on-the-mountain, and sweet alyssum.

Flowers that are white or with pure white varieties: 4 feet, cosmos; 3 feet, dahlia and sweet-sultan; 2½ feet, clarkia, cornflower, larkspur, and scabiosa; 2 feet, baby's-breath, China aster, summer chrysanthemum, lupine, Japanese bellflower, snapdragon, garden balsam, and poppy; 1½ feet, godetia, four-o'clock, rose everlasting, and stock; 1 foot, candytuft, Iceland poppy, petunla, ageratum, lobella, portulaca, sweet alyssum, and verbenal.

Flowers having varieties mixed with white: 3 feet, dahlia; 2½ feet, salpiglossis; 1 foot, nemophila, pansy, petunia, and pink.

Flowers yellow or with yellow varieties: 4 feet, sunflower, feather cockscomb, and dahlia; 2½ feet, strawflower, sunflower, and zinnia; 2 feet, calliopsis, summer chrysanthemum, African marigold, snapdragon, and four-o'clock; 1 foot, calendula, Cape marigold, French marigold, Iceland poppy, California poppy, dwarf marigold, and portulaca.

Flowers having varieties mixed with yellow: 4 feet, dahlia; 2 feet, calliopsis, rudbeckia, salpiglossis, and summer chrysanthemum; 1½ feet, four-o'clock; 1 foot, dwarf nasturtium and pansy.

Flowers of orange color or with orange varieties: 3 feet, heliopsis; 2½ feet, zinnia; 2 feet, African marigold; 1 foot, calendula, Cape marigold, French marigold, and California poppy.

Flowers having varieties mixed with orange: 2 feet, galliardia; 1 foot, dwarf nasturtium and French marigold.

Flowers lavender or with lavender varieties: 3 feet, basketflower and sweet-sultan; 2½ feet, larkspur; 2 feet, China aster; 1½ feet, candytuft; 1 foot, Drummond phlox, nemophilla, and pansy.

Flowers having varieties mixed with lavender: 2½ feet, salpiglossis; 1 foot, pansy.

Flowers blue or with blue varieties: 2½ feet, cornflower and larkspur; 2 feet, lupine and Japanese bellflower; 1 foot, nemophila, ageratum, lobella, verbenal, and forget-me-not.

Flowers purple or with purple varieties: 3 feet, sweet-sultan; 2½ feet, clarkia and scabiosa; 2 feet, China aster; 1½ feet, stock; 1 foot, verbenal.

Flowers having varieties mixed with purple: 2½ feet, salpiglossis; 1 foot, pansy.

Flowers pink or with pink varieties: 4 feet, cosmos; 3 feet, dahlia; 2½ feet, larkspur and zinnia; 2 feet, China aster, garden balsam, and poppy; 1½ feet, rose everlasting; 1 foot, Drummond phlox, pinks (including carnations), portulaca, and verbenal.

Flowers having varieties mixed with pink: 3 feet, dahlia; 1 foot, pinks (including carnations).

Flowers salmon or with salmon varieties: 3 feet, dahlia; 2½ feet, clarkia; 2 feet, snapdragon and poppy; 1 foot, Drummond phlox.

Flowers having varieties mixed with salmon pink: 3 feet, dahlia; 1 foot, Drummond phlox.

Flowers scarlet or with scarlet varieties: 3 feet, dahlia; 2½ feet, scarlet sage and zinnia; 2 feet, snapdragon, poppy, and four-o'clock; 1 foot, Drummond phlox, pinks (including carnations), dwarf nasturtium, portulaca, and verberna.

Flowers having varieties mixed with scarlet: 3 feet, dahlia; 2 feet, snapdragon and poppy; 1 foot, Drummond phlox, pinks (including carnations), and dwarf nasturtium.

Flowers rose or crimson or with rose or crimson varieties: 4 feet, cosmos; 3 feet, prince's-feather, feather cockscomb, sweet-sultan, and spiderflower; 2½ feet, clarkia, cornflower, seablosa, and zinnia; 2 feet, garden balsam, China aster, cockscomb, and lupine; 1½ feet, godetia, four-o'clock, globe amaranth, stock, and candytuft; 1 foot, Drummond phlox, petunia, and portulaca.

Flowers having varieties mixed with rose or crimson: 1 foot, Drummond phlox and petunia.

Plants used for their foliage or chiefly for it, the foliage being green unless otherwise noted: 4 feet, castor-bean (bronze and green separate), sorghum, feterita, milo, broom corn, and Indian corn; 3 feet, Joseph's-coat (red, yellow, and green mixed), love-lies-bleeding (red), summer cypress (pea green, turning crimson in late summer); 2½ feet, annual polinsettia (scarlet leaves in late summer) and snow-on-the-mountain (white-edged leaves); 1½ feet, Job's-tears; 1 foot, mignonette (a greenish flower grown for its sweet odor, but in its garden decorative value comparable to a plant grown for its foliage).

THE PRINCIPAL CHARACTERISTICS OF SOME ANNUAL FLOWERING PLANTS.

The following list presents in easily accessible form the principal characteristics of some annual flowering plants. *Some annual flowering plants, showing their hardiness, height of growth, color of flowers, etc.; also the page in this bulletin where a description of each plant and directions for its culture will be found.*

Common name.	Height of plant (feet).	Grown for flowers or foliage.	Color of flowers or foliage.	Preference for sun or shade.	Hardiness of plant.	Described on page—
Acroclinium. See Rose everlasting.						
African golden daisy. See Marigold, Cape.						
African marigold. See Marigold, African.						
Ageratum.....	1	Flowers.....	Blue, white, rose.	Sun.....	Tender.....	67
Alyssum, sweet.....	1	do.....	White.....	do.....	Very hardy.....	72
Amaranth, globe.....	1 1/2	do.....	Crimson or rose	do.....	Hardy.....	52
Amaranthus caudatus. See Love-lies-bleeding.						
Amaranthus eruentus. See Prince's-feather.						
Amaranthus tricolor. See Joseph's-coat.						
Antirrhinum. See Snapdragon.						
Aster, China.....	2	do.....	Purple, rose, white	do.....	Half hardy.....	40
Aster marigold. See Marigold, African.						
Baby's-breath.....	2	do.....	White.....	do.....	Hardy.....	38
Bachelor's-button. See Cornflower.						
Balloonflower. See Bellflower, Japanese.						
Balsam.....	2 1/2	do.....	Rose, pink, white	do.....	Tender.....	48
Bean, castor. See Castor-bean.	3	do.....	Rose, lavender.	Sun, slight shade.	Hardy.....	28
Bellflower, Chinese. See Bellflower, Japanese.						
Bellflower, Japanese.....	2 1/2	do.....	Blue, white.	Sun, partial shade.	do.....	46
Belvedere.....	3	Foliage.....	Pea green.	Sun.....	Very hardy.....	31
Black-eyed-susan. See Ruthieekia.						
Blanket flower. See Gaillardia.						
Bluebell. See Cornflower.						
Blueet. See Cornflower.						
Broom corn. See Corn, broom.						
Campanula.....	1	Flowers.....	Yellow, orange	do.....	Half hardy.....	57
California poppy. See Poppy, California.						
California.....	2	do.....	Yellow, brown	do.....	Tender.....	40
Calliopais.....	1	do.....	Crimson, lavender, white.	do.....	Hardy.....	58
Candytuft.....						
Cape marigold. See Marigold, Cape.						
Carnation, Marguerite.....	1	do.....	Scarlet, pink, white	do.....	do.....	61
Carpet of Snow alyssum. See Alyssum, sweet.						
Castor-bean.....	4	Foliage.....	Green, bronze	Full sun	Tender.....	22

Some annual flowering plants, showing their hardiness, height of growth, color of flowers, etc.; also the page in this bulletin where a description of each plant and directions for its culture will be found—Continued.

Common name.	Height of plant (feet).	Grown for flowers or foliage.	Color of flowers or foliage.	Preference for sun or shade.	Hardiness of plant.	Described on page—
Castor-oil plant. See Castor-bean.						
Celosia plumosa. See Cockscomb, feather.						
Centaurea americana. See Basketflower.						
Centaurea cyanus. See Cornflower.						
Centaurea imperialis. See Sweet-sultan.						
China aster. See Aster, China.						
Chinese bellflower. See Bellflower, Japanese.						
Chinese pink. See Dianthus.						
Chrysanthemum, summer.						
Clarkia.	2	Flowers.	Yellow, white.	Sun.	Tender.	42
Cleome spinosa. See Spiderflower.	2½	do.	Salmon, white.	Sun, partial shade.	Hardy.	32
Cockscomb.	2	do.	Crimson.	Sun.	Tender.	43
Cockscomb, feather.	3	do.	Crimson, yellow.	do.	do.	28
Cockscomb, plumed. See Cockscomb, feather.						
Coneflower. See Rudbeckia.						
Coreopsis. See Calliopsis.						
Corn, broom.	4+	Foliage.	Green.	Sun.	do.	26
Corn, Indian.	4+	do.	do.	do.	do.	26
Cornflower.	2½	Flowers.	Blue, rose, white.	Sun, shade.	Very hardy.	32
Cosmos.	4+	do.	Rose, pink, white.	Full sun.	Hardy.	23
Cypress, summer.	3	Foliage.	Ice green.	Sun.	Very hardy.	31
Dahlia.	3	Flowers.	Red, yellow, white.	do.	Tender.	29
Daisy, African golden. See Marigold, Cape.						
Delphinium. See Larkspur.	1	do.	Scarlet, pink, white.	do.	Hardy.	60
Dianthus.						
Dimorphotheca. See Marigold, Cape.						
Drummond phlox. See Phlox, Drummond.						
Dwarf marigold. See Marigold, dwarf.						
Dwarf nasturtium. See Nasturtium, dwarf.						
Euphorbia. See Snow-on-the-mountain and Poinsettia.						
Everlasting, rose. See Rose everlasting.						
Firewall-to-spring. See Godetia.						
Feather cockscomb. See Cockscomb, feather.						
Fetelia.	4+	Foliage.	Green.	Full sun.	Tender.	26
Fire plant, Mexican. See Poinsettia.						
Flame plant, Mexican. See Cypress, summer.						
Flossflower. See Ageratum.	1	Flowers.	Blue.	Partial shade.	Hardy.	75
Forget-me-not.	1½	do.	Crimson, yellow, white.	Sun.	Tender.	50
Four-o'clock.						
French marigold. See Marigold, French.						

Gaillardia.....	2	do	Orange, crimson.	do	Hardy	45
Globe amaranth. See Amaranth, globe.						
Glow, golden. See Rudbeckia.						
Godetia.....	1½	do	Rose, light purple, white.	Sun, half shade.	do	52
Golden glow. See Rudbeckia.						
Gomphrena. See Amaranth, globe.						
Grass pink. See Dianthus.						
Gypsophila. See Baby's-breath.						
Heartsease. See Pansy.						
Helichrysum. See Strawflower.						
Helopsis.....	3	do	Orange.	Sun.	do	31
Iceland poppy. See Poppy, Iceland.						
Impatiens. See Balsam.						
Indian corn. See Corn.						
Japanese bellflower. See Bellflower, Japanese.						
Japanese pink. See Dianthus.						
Joe-Pye-weed.....	1½	Foliage and fruit.	Green.	do	Half hardy.	52
Joseph coat.	3	Foliage.	Red, yellow, green.	Full sun.	Tender.	30
Kalsierblume. See Cornflower.						
Kochia scoparia. See Cypress, summer.						
Lady's-slipper. See Balsam.						
Larkspur.....	2½	Flowers.	Blue, pink, white.	do	Very hardy.	33
Lobelia.....	1	do	Blue, white.	Sun.	Hardy.	38
Love-lies-bleeding.	3	Foliage.	Red.	Full sun.	Tender.	30
Lupine.....	2	Flowers.	Blue, rose, white.	Sun.	Hardy.	43
Marguerite carnation. See Carnation, Marguerite.						
Marigold, African.	2	do	Yellow, orange.	do	do	46
Marigold, Cape.	1	do	Orange, yellow.	do	do	58
Marigold, dwarf.	1	do	Golden, yellow.	do	Tender.	74
Marigold, French.	1	do	Yellow, orange, brown.	do	Half hardy.	59
Marigold, pot. See Calendula.						
Marvel-of-Peru. See Four-o'clock.						
Mathiola. See Stock.						
Mexican fire plant. See Poinsettia.						
Mexican flame plant. See Cypress, summer.						
Mignonette.....	1½	do	Greenish (sweet scented).	do	do	53
Milo.....	4+	Foliage.	Green.	Full sun.	Tender.	26
Mourning bride. See Scabiosa.						
Nasturtium, dwarf.....	1	Flowers.	Scarlet, orange, yellow.	Sun.	do	69
Nemophila.....	1	do	Blue, lilac, white.	Shade.	Hardy.	64
Nigerhead. See Rudbeckia.						
Orange sunflower. See Helopsis.						
Painted-leaf. See Poinsettia.						
Painted-tongue. See Salpiglossia.						
Pansy.....	1	do	Purple, yellow, blue.	Shade, sun.	do	70
Petunia.....	1	do	Rose, purple, white.	Sun.	Tender.	65

Some annual flowering plants, showing their hardness, height of growth, color of flowers, etc.; also the page in this bulletin where a description of each plant and directions for its culture will be found—Continued.

Common name.	Height of plant (feet).	Grown for flowers or foliage.	Color of flowers or foliage.	Preference for sun or shade.	Hardiness of plant.	Described on page—
Phlox, Drummond.	1	Flowers.....	Red, lilac, buff, white.	Sun.....	Hardy.....	59
Phlox drummondii. See Phlox, Drummond.						
Pincushion flower. See Scabiosa.						
Pink, Chinese. See Dianthus.						
Pink, grass. See Dianthus.						
Pink, Japanese. See Dianthus.						
Pink, Scotch. See Dianthus.						
Platycodon. See Bellflower, Japanese.						
Plumed cockscomb. See Cockscomb, feather.						
Poinsettia.....	2½	Foliage.....	Green, turning to scarlet.	do.....	Tender.....	35
Poppy.....	2	Flowers.....	Scarlet, pink, white.	do.....	Very hardy.....	49
Poppy, California.	1	do.....	Yellow, orange.	do.....	do.....	65
Poppy, Iceland.	1	do.....	Yellow, orange, white.	do.....	Hardy.....	65
Poppy, Shirley. See Poppy.						
Portulaca.....	1	do.....	Reds and yellows.	do.....	Tender.....	71
Prince's-feather.....	3	do.....	Red.	do.....	do.....	31
Pot marigold. See Calendula.						
Ragged-robin. See Cornflower.						
Ragged-sailor. See Cornflower.						
Ricinus. See Castor-bean.						
Robin, ragged. See Cornflower.						
Rose everlasting.	1½	do.....	Pink and white.	do.....	Half hardy.....	54
Rudbeckia.....	2	do.....	Yellow, crimson.	Sun, partial shade.	Hardy.....	44
Sage, scarlet.	2½	do.....	Brilliant scarlet.	Sun.....	Tender.....	36
Sailor, ragged. See Cornflower.						
Salpiglossis.....	2	do.....	Purple, crimson, white.	do.....	do.....	47
Salvia. See Sage, scarlet.						
Salvia, scarlet. See Sage, scarlet.						
Scabiosa.....	2½	do.....	Crimson, rose, blue, white.	do.....	do.....	85
Scabious, sweet. See Scabiosa.						
Scarlet sage. See Sage, scarlet.						
Scarlet salvia. See Sage, scarlet.						
Scotch pink. See Dianthus.						
Shirley poppy. See Poppy.						
Snnapdragon.....	2	do.....	Scarlet, yellow, white.	do.....	Very hardy.....	47

Snow-on-the-mountain.....	2	Foliage.....	Green leaves with white edge.	do.....	do.....	50
Sorghum.....	4+	do.....	Green.....	Full sun.....	Tender.....	26
Spiderflower.....	3	Flowers.....	Rose.....	Sun.....	do.....	31
Standing cypress. See Cypress, summer.						
Stock.....	1½	do.....	Crimson, purple, white.	do.....	Hardy.....	54
Strawflower.....	2½	do.....	Lemon, yellow.....	do.....	do.....	36
Sultan, sweet. See Sweet-sultan.						
Summer chrysanthemum. See Chrysanthemum, summer.						
Summer cypress. See Cypress, summer.						
Sunflower.....	4+	do.....	Yellow.....	Full sun.....	do.....	25
Sunflower, orange. See Hellopals.						
Sun plant. See Portulaca.						
Sweet alyssum. See Alyssum, sweet.						
Sweet scabious. See Scabiosa.						
Sweet-sultan.....	3	do.....	Red, purple, lavender, white.	Sun.....	Half hardy.....	31
Sweet-william. See Dianthus.						
Taraxac. See Marigold, dwarf.						
Tasselflower. See Ageratum.						
Tom Thumb nasturtium. See Nasturtium, dwarf.	1	do.....	Scarlet, blue, purple, white.	do.....	Tender.....	74
Verbena.....	2½	do.....	Rose, scarlet, yellow, orange.	do.....	Hardy.....	37
Youth-and-old-age. See Zinnia.						
Zinnia.....						

